Service Manual

LCD TV



Model No.	Service Reference No.
FVM4612	P46142-03
DP46132	P46142-04
DP46132M	P46142M-04

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams. Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

SANYO

Sanyo Manufacturing Corp. 3333
Sanyo Road, Forrest City, AR 72335
Printed in China, Dec, 2012

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1 Safety Precautions

1.1. General Guidelines

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers, insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.
4. When conducting repairs and servicing, do not attempt to modify the equipment, its parts or its materials.
5. When wiring units (with cables, flexible cables or lead wires) are supplied as repair parts and only one wire or some of the wires have been broken or disconnected, do not attempt to repair or re-wire the units. Replace the entire wiring unit instead.
6. When conducting repairs and servicing, do not twist the Faston connectors but plug them straight in or unplug them straight out.

1.1.1. Leakage Current Cold Check

1. Unplug the AC cord and connect a jumper between the two prongs on the plug.
2. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the equipment such as screw heads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be 100 Mohm and over. When the exposed metal does not have a return path to the chassis, the reading must be ∞.

1.1.2. Leakage Current Hot Check (See Figure 1.)

1. Plug the AC cord directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5kohm, 10 watts resistor, in parallel with 0.15μF capacitors, between each exposed metallic part on the set and a good earth ground such as a water pipe, as shown in Figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed 1/2 milliamp. In case a measurement is outside of the limits specified, there is a possibility of a shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

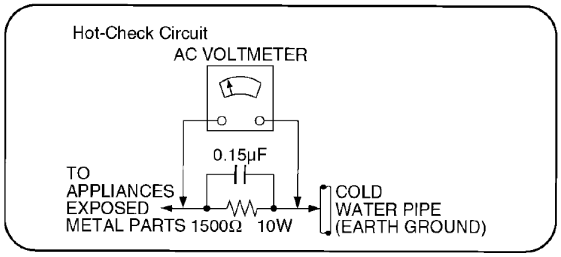


Figure 1

2 Warning

2.1. Prevention of Electrostatic Discharge (ESD) to Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor [chip] components. The following techniques should be used to help reduce the incidence of component damage caused by electrostatic discharge (ESD).

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any ESD on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging ESD wrist strap, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified as [anti-static (ESD protected)] can generate electrical charge sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

   Caution

   Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise ham less motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity (ESD) sufficient to damage an ES device).

2.2. About lead free solder (PbF)

Note: Lead is listed as (Pb) in the periodic table of elements.

In the information below, Pb will refer to Lead solder, and PbF will refer to Lead Free Solder.

The Lead Free Solder used in our manufacturing process and discussed below is (Sn+Ag+Cu).

That is Tin (Sn), Silver (Ag) and Copper (Cu) although other types are available.

This model uses Pb Free solder in it's manufacture due to environmental conservation issues. For service and repair work, we'd suggest the use of Pb free solder as well, although Pb solder may be used.

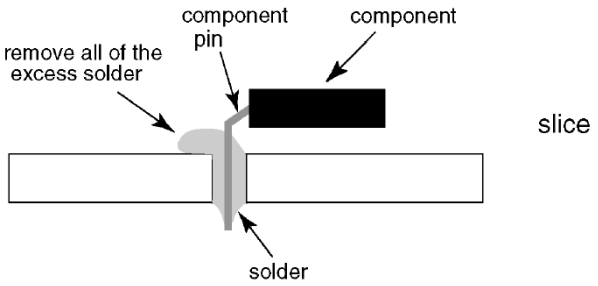
PCBs manufactured using lead free solder will have the PbF within a leaf Symbol **PbF** stamped on the back of PCB.

Caution

- Pb free solder has a higher melting point than standard solder. Typically the melting point is 50 ~ 70 °F (30~40 °C) higher. Please use a high temperature soldering iron and set it to 700 ± 20 °F (370 ± 10 °C).
- Pb free solder will tend to splash when heated too high (about 1100 °F or 600 °C).

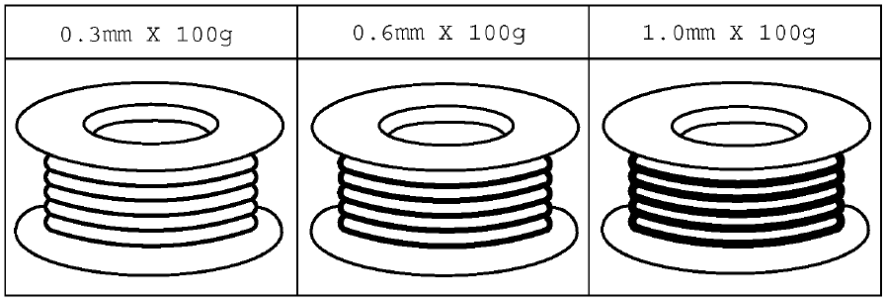
If you must use Pb solder, please completely remove all of the Pb free solder on the pins or solder area before applying Pb solder.If this is not practical, be sure to heat the Pb free solder until it melts, before applying Pb solder.

- After applying PbF solder to double layered boards, please check the component side for excess solder which may flow onto the opposite side. (see figure below)



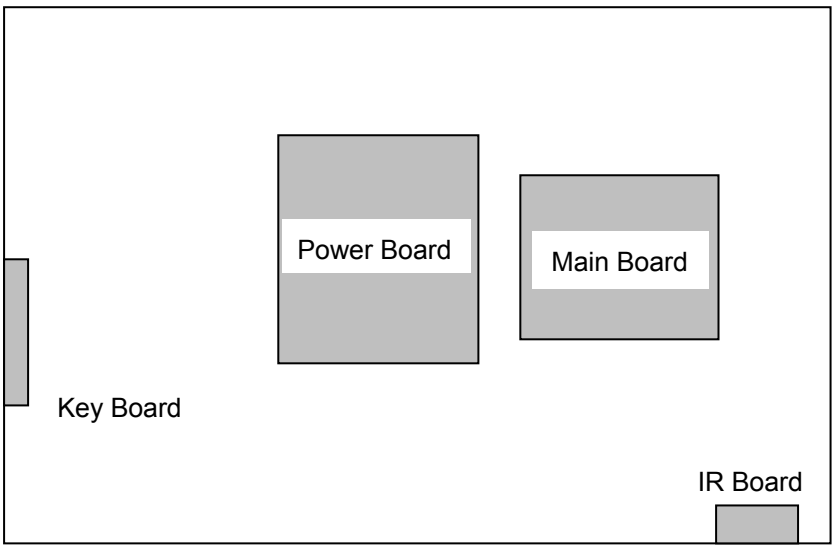
Suggested Pb free solder

There are several kinds of Pb free solder available for purchase. This product uses Sn+Ag+Cu (tin, silver, copper) solder. However, Sn+Cu (tin, copper), Sn+Zn+Bi (tin, zinc, bismuth) solder can also be used.



3 Service Navigation

3.1 Service Hint



Board Name	Function	Remarks
Main Board	SPDIF,COMPONENT/AV IN, ANTENNA/DTV/TV, PC IN,PC/DVI IN/AUDIO, HDMI(HDMI1/DVI,HDMI2,HDMI3),USB PORT	All boards are non serviceable and should be exchanged for service
IR Board	Remote Receiver, LED	
Power Board	Power (AC/DC), DC-DC	
Key Board	Control Button, Power switch	

3.2. Applicable signals

Resolution	VGA	HDMI-DVI	Component	Horizontal Freq. (KHz)	Vertical Freq. (Hz)	Nominal Pixel Clock (MHz)
640x480@60Hz	●	●		31.469	59.940	25.175
720x400@70Hz	●	●		31.469	70.087	28.322
800x600@60Hz	●	●		37.879	60.317	40.000
1024x768@60Hz	●	●		48.363	60.004	65.000
1280x720@60Hz	●	●		44.772	59.855	74.500
1280x768@60Hz	●	●		47.396	59.995	68.250
1280x1024@60Hz	●	●		63.981	60.020	108.000
1440x900@60Hz	●	●		55.469	59.901	88.750
1680x1050@60Hz	●	●		65.290	59.954	146.250
720x480i 59.94/60Hz		●	●			
720x480P 59.94/60Hz		●	●			
720P 59.94/60Hz		●	●			
1080i 59.94/ 60Hz		●	●			
1080P 24Hz		●				
1920x1080@60Hz	●	●		67.500	60.000	148.500

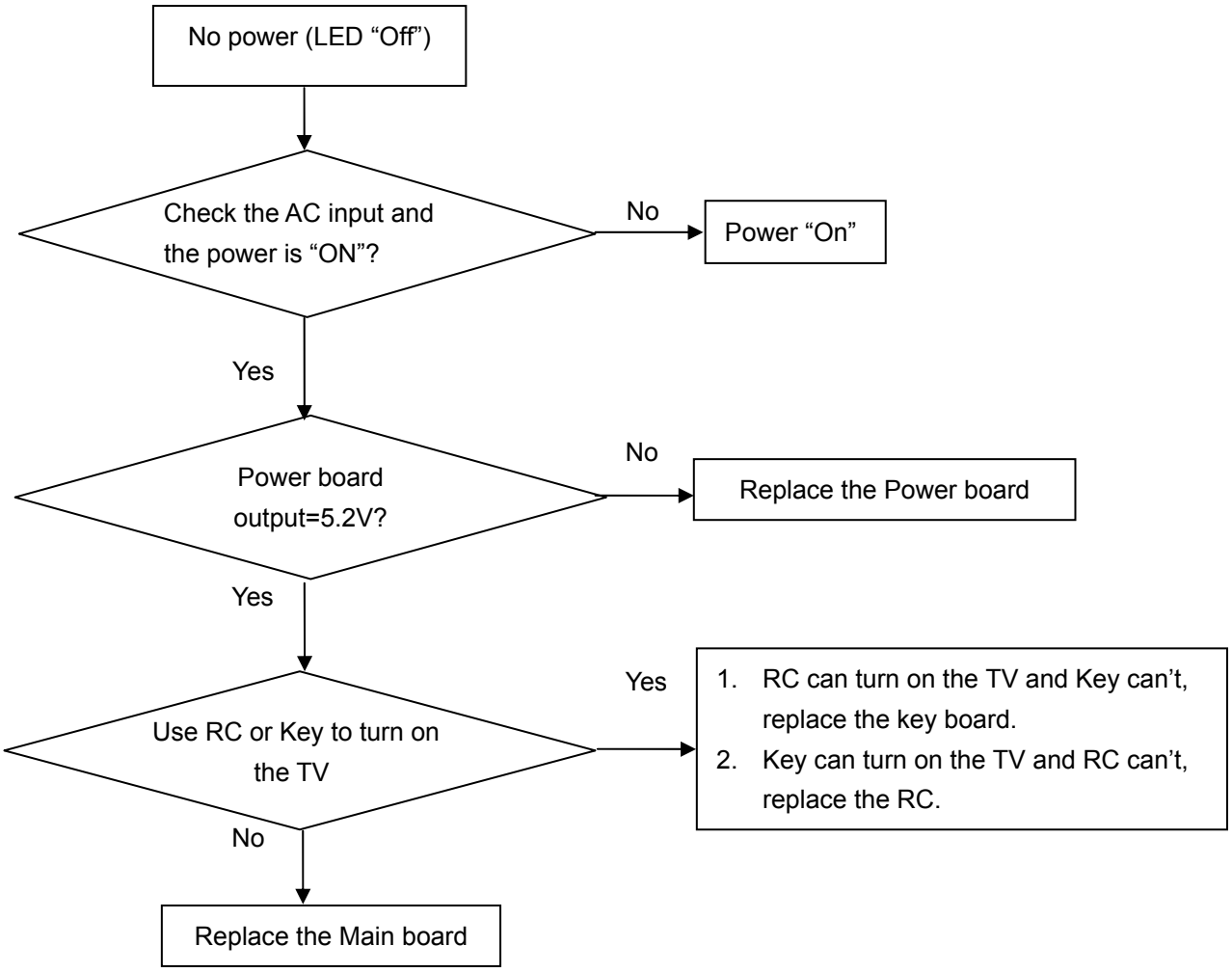
4 Specifications

Panel Type	• LCD
Panel Size	• 46"
Maximum Visible Range	• 1018.08(H)× 572.67(V)
Refresh Rate	• 60 Hz
Picture Resolution	• Full HD (1920x1080)
Viewing Angle	• 178°(H), 178°(V)
Brightness	• 350 cd/m^2
Contrast Ratio	• 3000:1 (Typical)
Voltage	• AC120V~ 60 Hz
Power Consumption	• 98 Watts
Color System	• NTSC, ATSC, Clear QAM
Channel Coverage	• Low band: 55.25 to 144.00MHz • Mid band: 145.00 to 424.00MHz • High band: 425.00 to 861.00MHz
Horizontal frequency	• 30 ~ 80 KHz
Vertical frequency	• 56 ~ 75 Hz
Inputs/Outputs	• DIGITAL AUDIO OUT (S/PDIF) • COMPONENT/AV IN • ANTENNA/DTV/TV • PC IN (D-Sub) • PC/DVI (AUDIO IN) • HDMI (HDMI1/DVI, HDMI2, or HDMI3) • USB
Audio Output	• 8W + 8W
Dimensions (Including Stand)	• 1056.2(L) x 214.9(W) x 673.3(H) mm
Net Weight (Including Stand)	• 15.8 kg
Operating Environment	• Operating Temperature: 0°C to 35°C • Operating Humidity: 10 % to 90 % (non-condensing) • Storage Temperature: -20°C to 60°C • Storage Humidity: 30% to 90% (non-condensing)

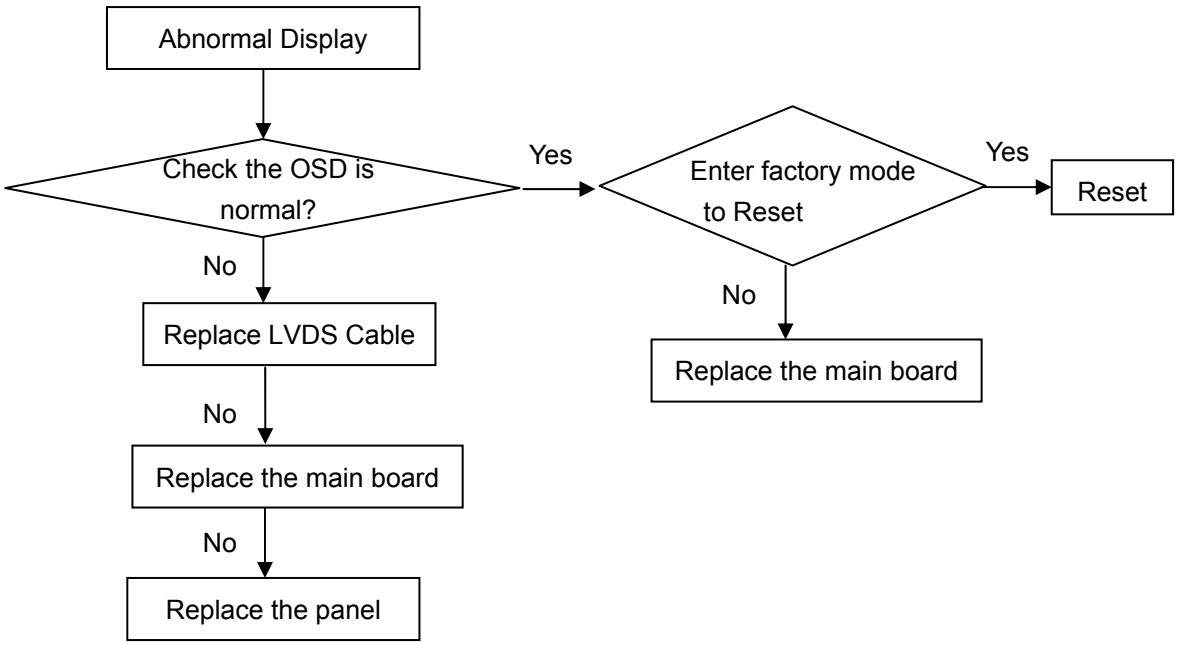
• Specifications are subject to change without notice.

5. Troubleshooting Guide

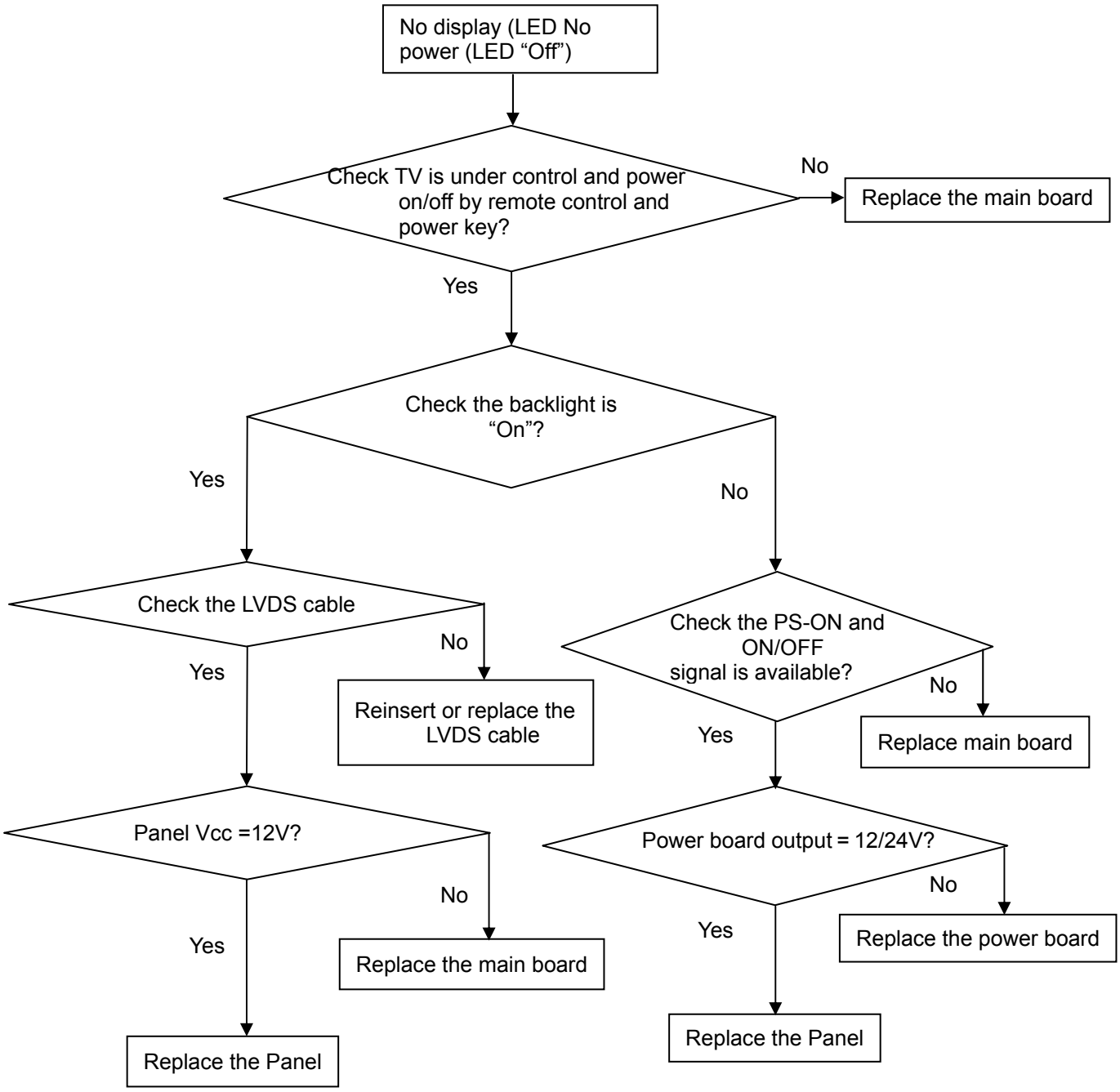
5.1 No Power



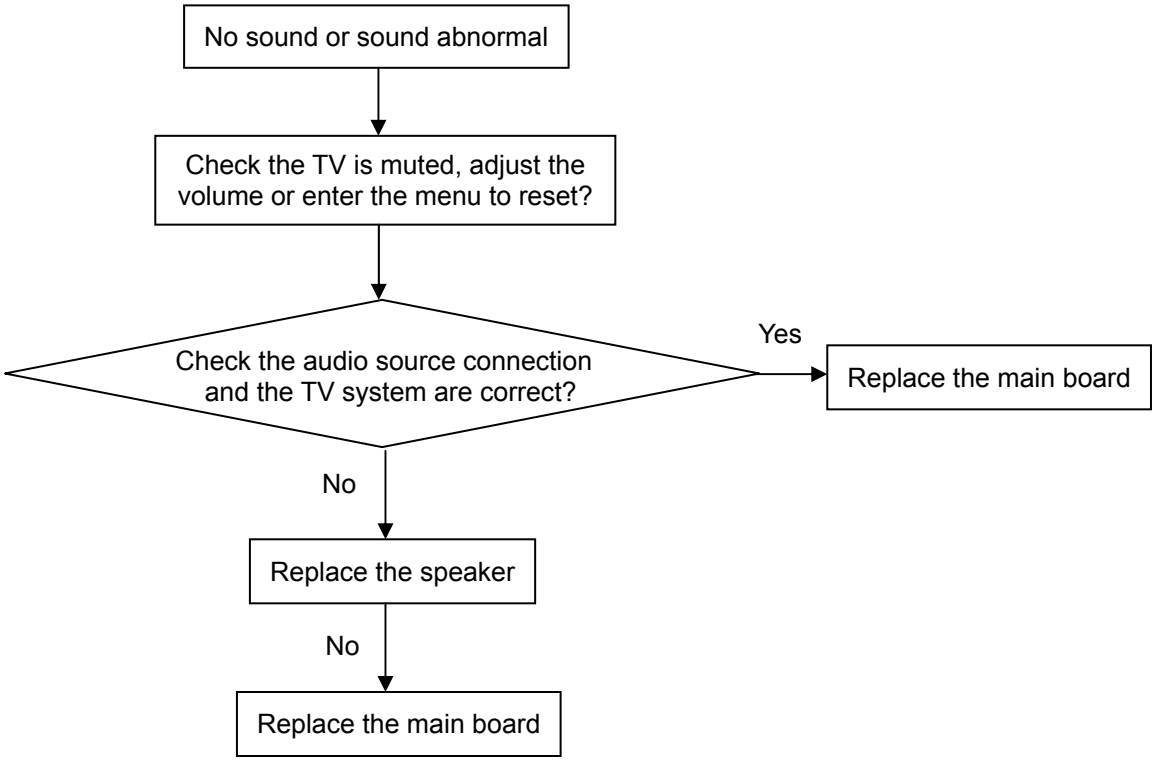
5.2 Abnormal Display



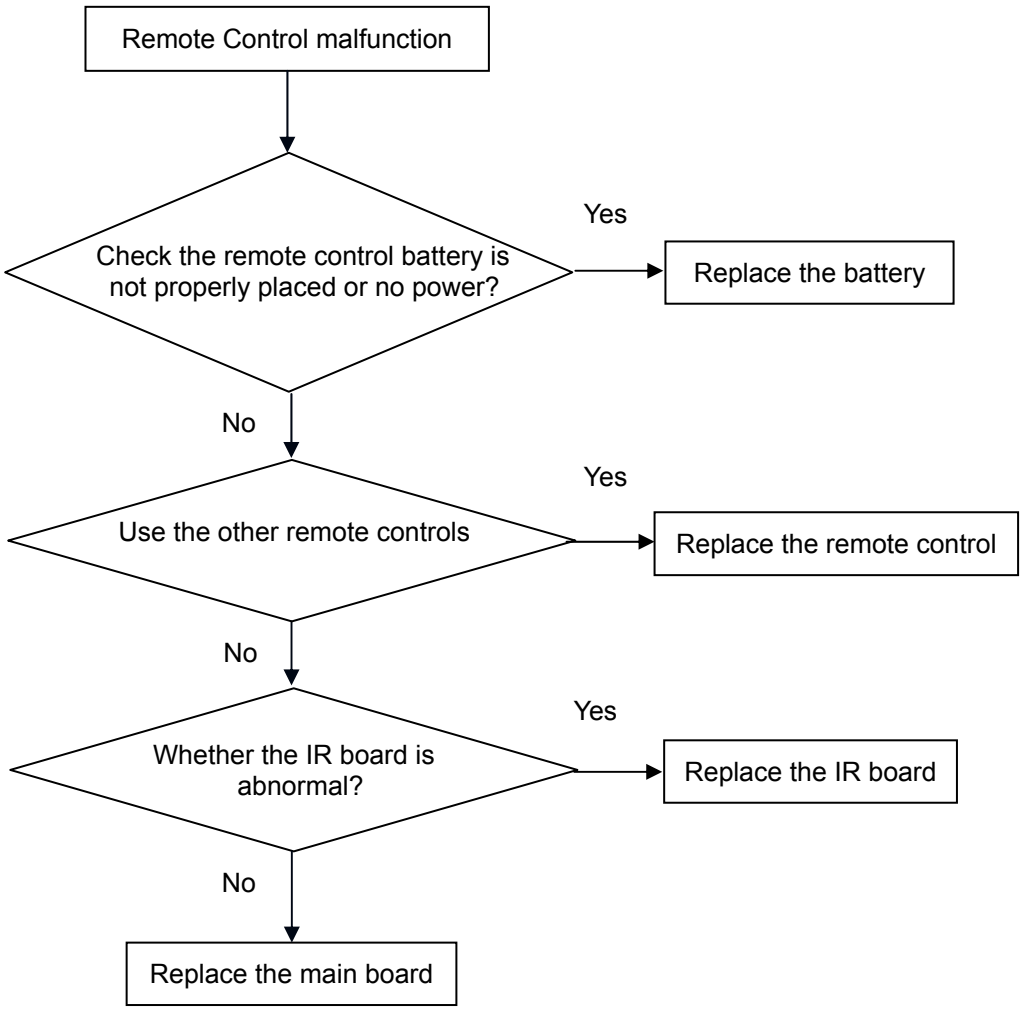
5.3 No Display



5.4 Sound Problem



5.5 Remote Control Malfunction

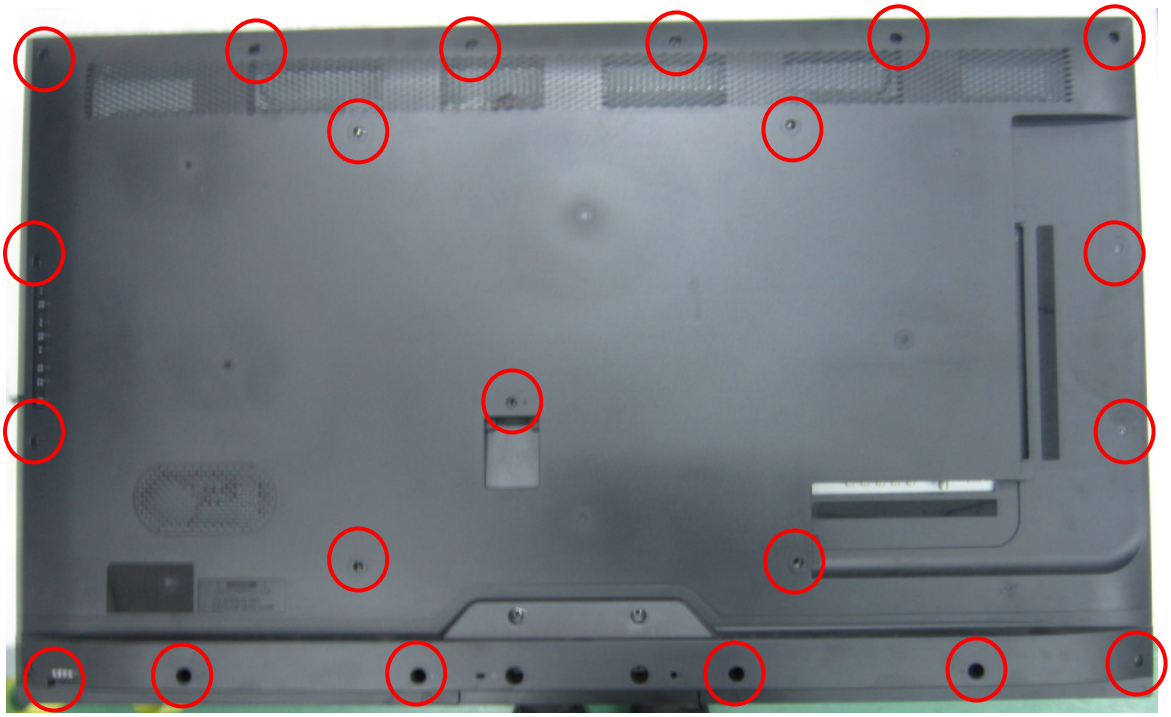


6. Disassembly and Assembly Instructions

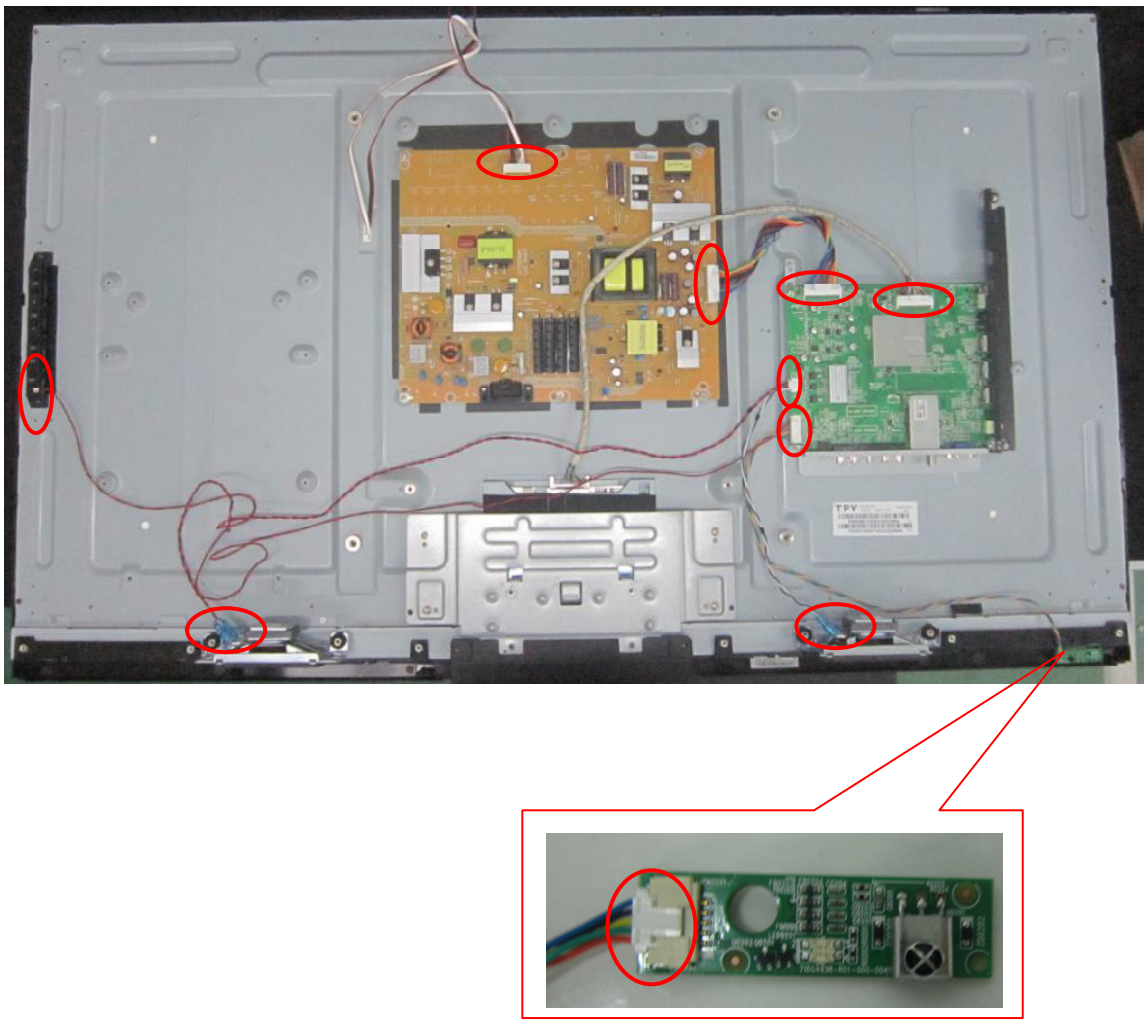
1. Remove the screws to remove the stand.



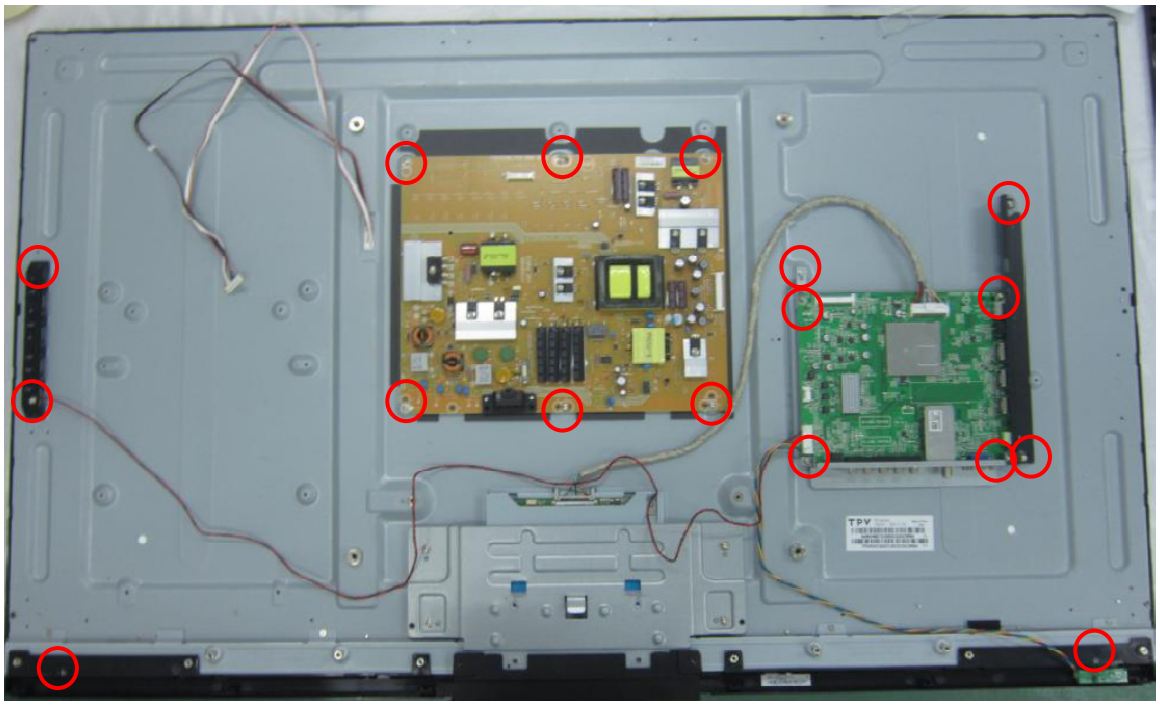
2. Remove the screws to remove the rear cover.



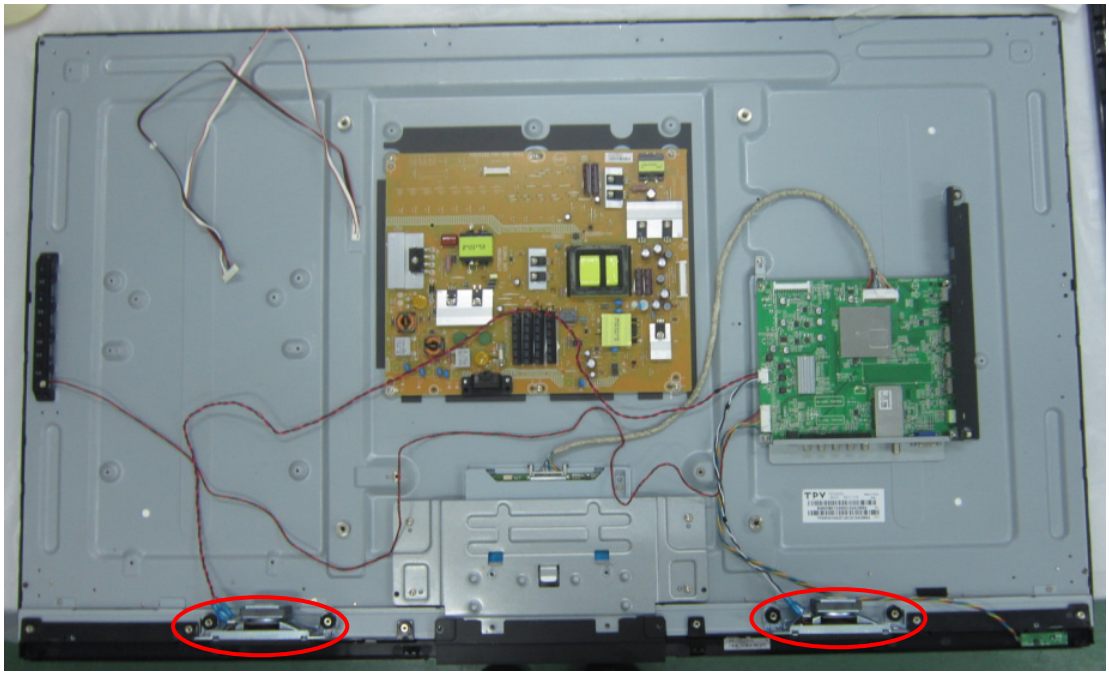
3. Unplug these connectors and cable clip on the IR board、Key board、main board and power board



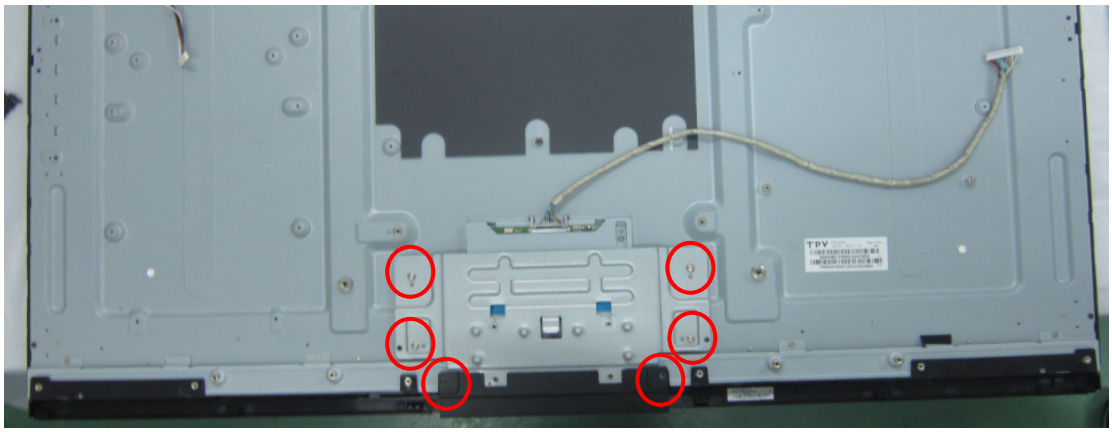
4. Remove the screws to remove the IR Board、Key Board、Main Board、 Power Board and Deco Bezel.



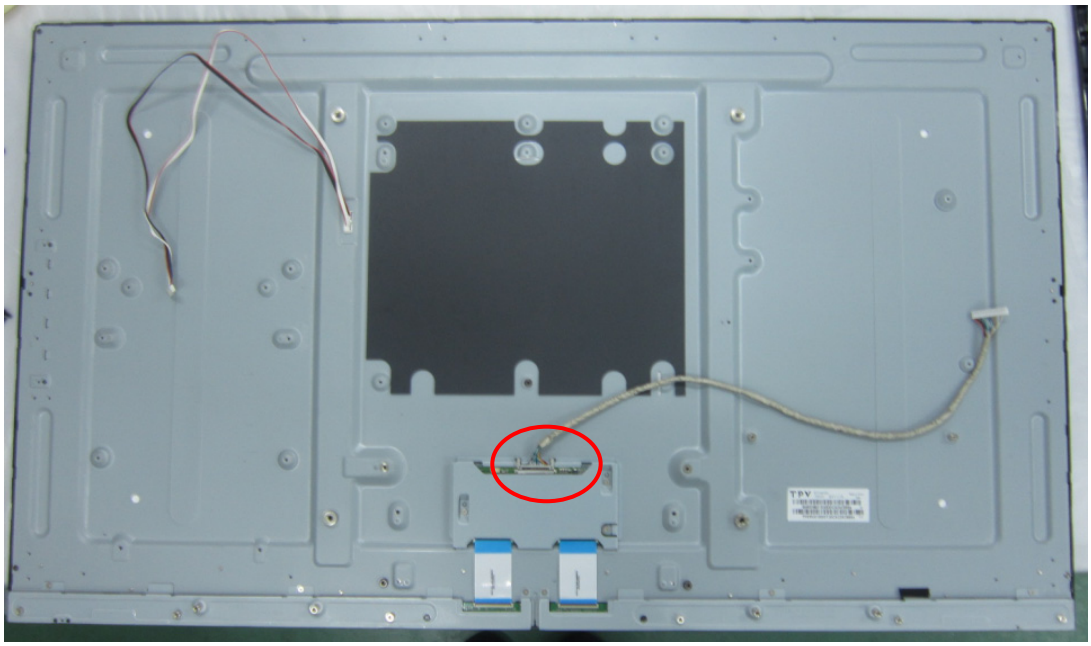
5. Remove the speakers



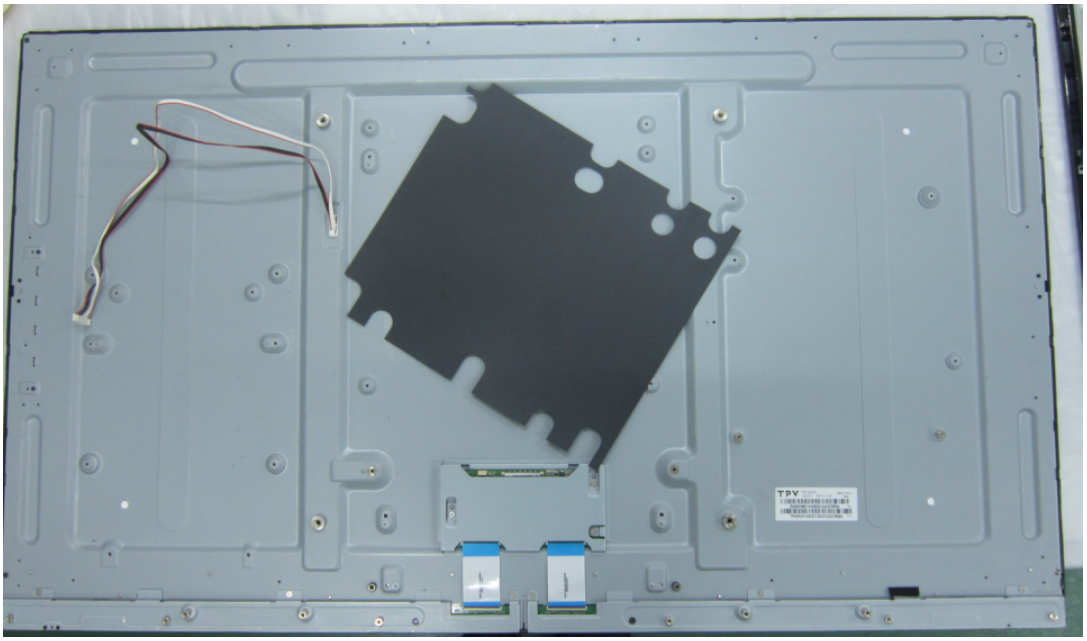
6. Remove the screws to remove the BKT and cover hinge.



7. Unplug the LVDS.

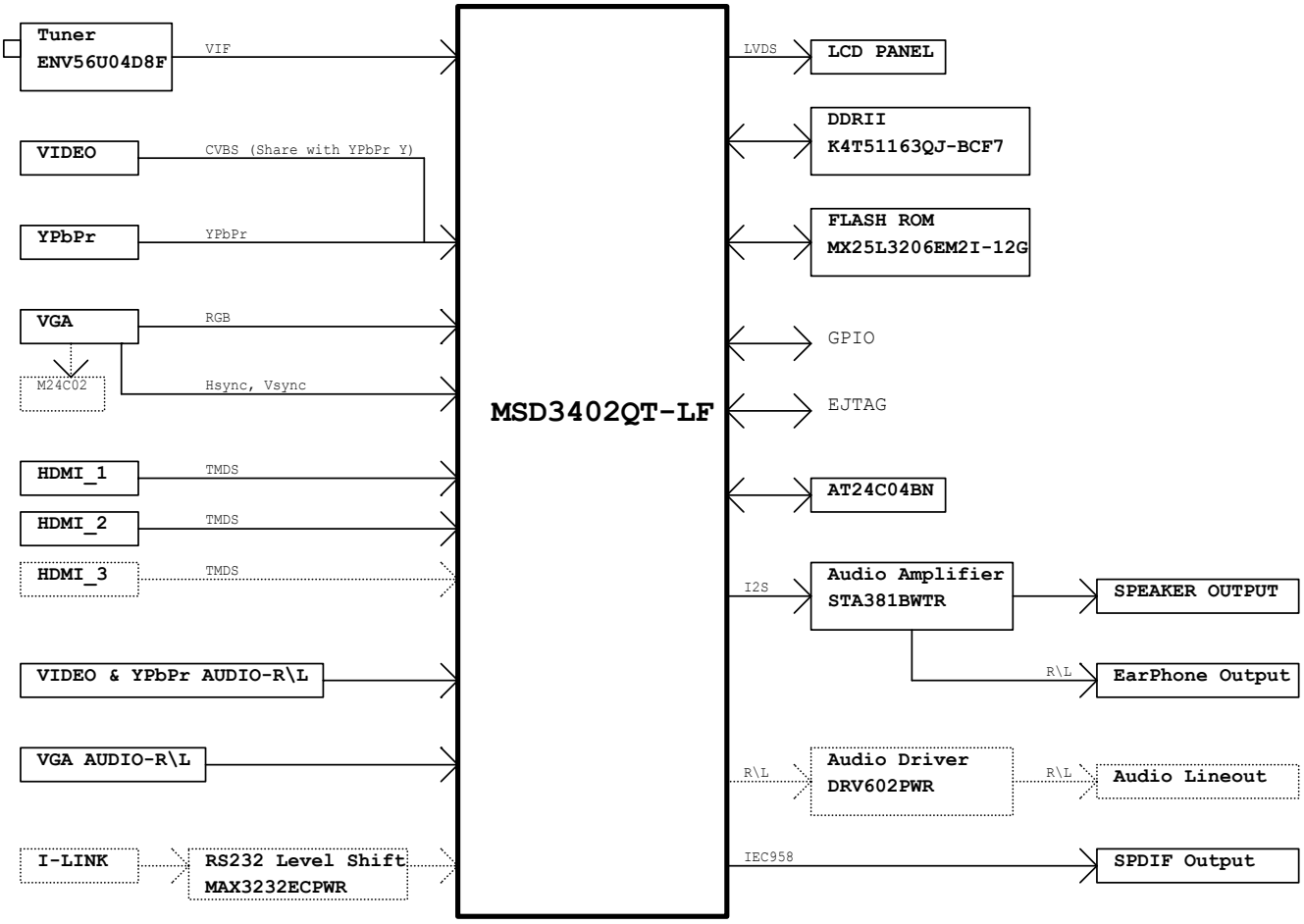


8. Remove the panel.

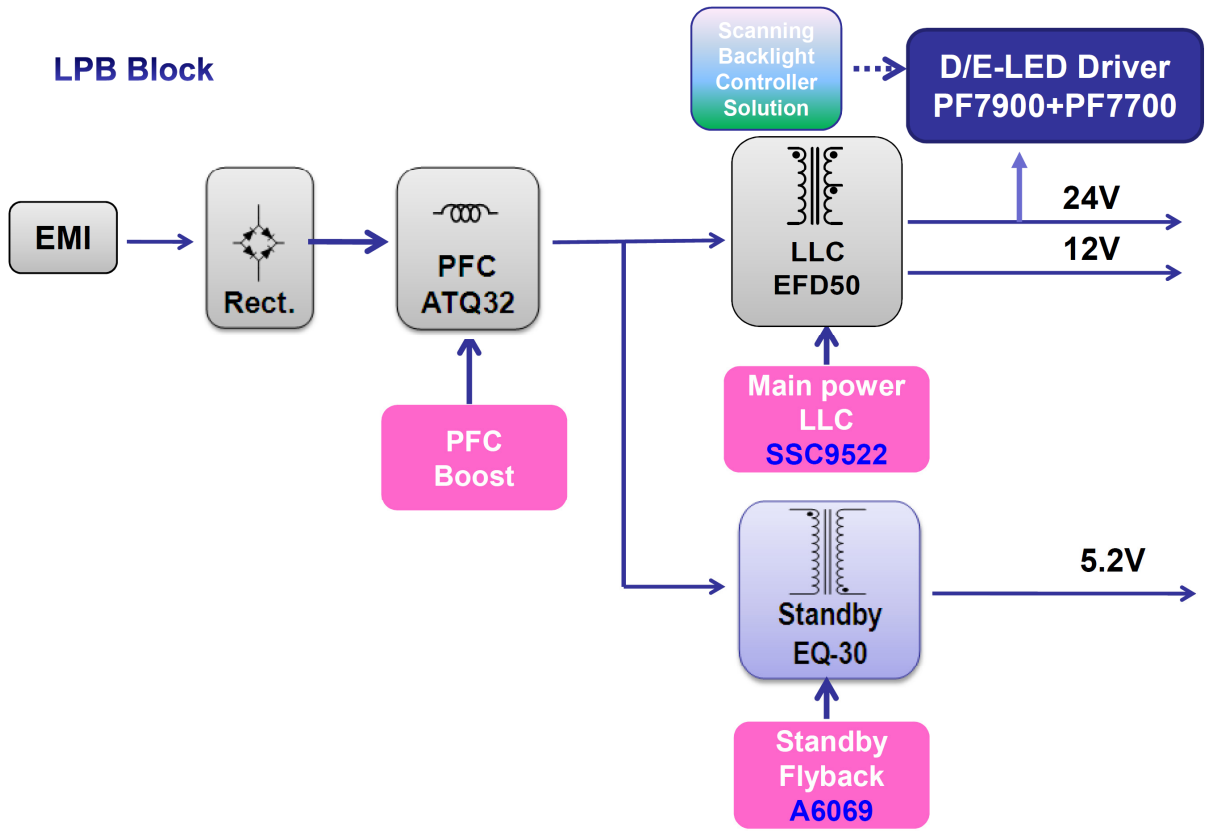


7 Block Diagram

Main Board



Power Board

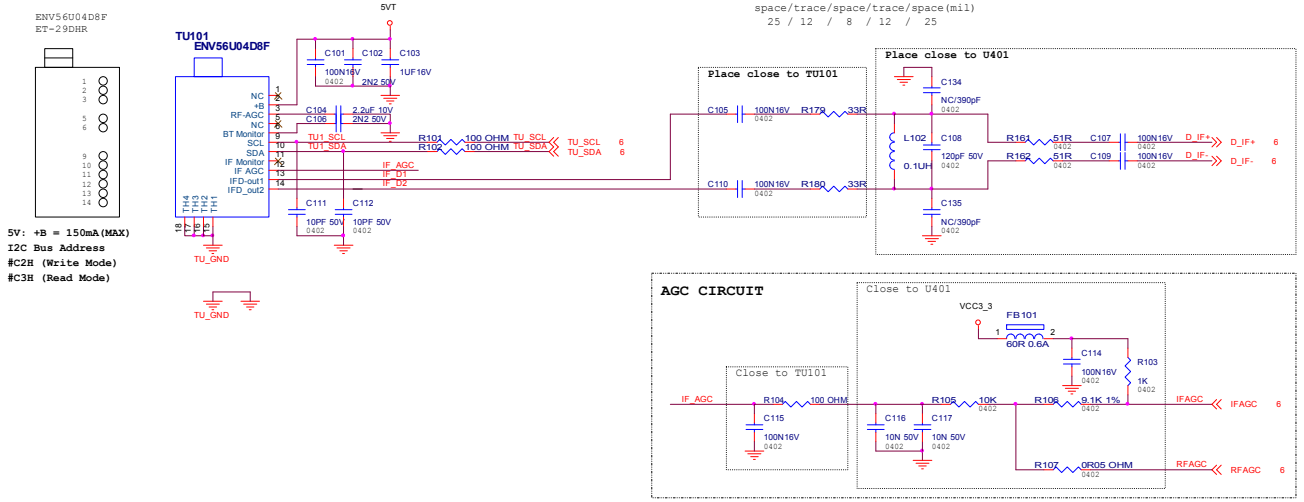


8. Schematic Diagram

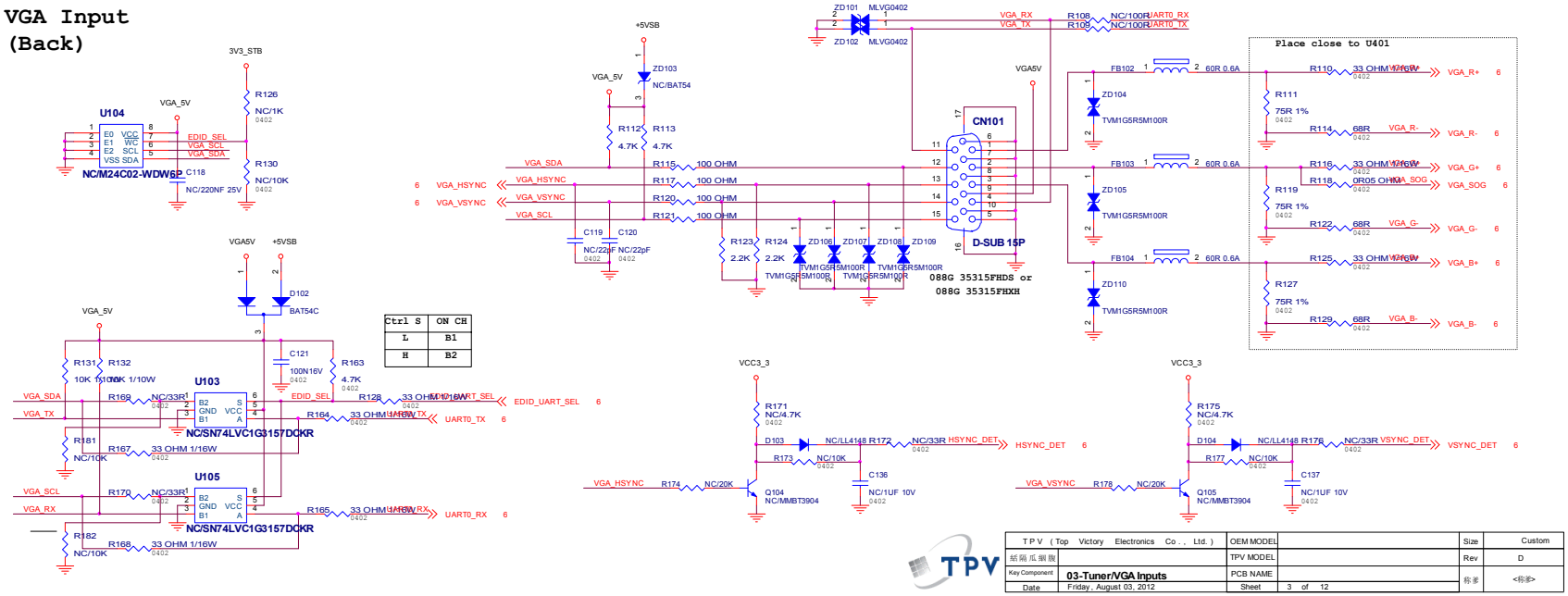
8.1 Main Board

715G5451M01001004K

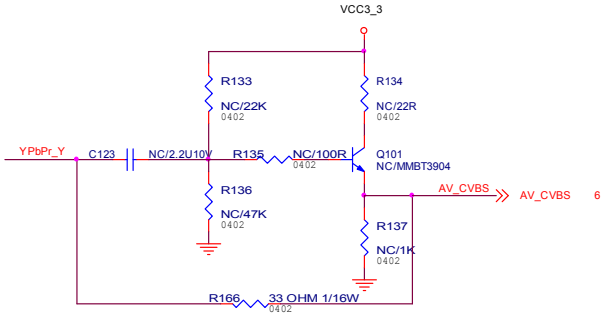
RF Input
(Back)

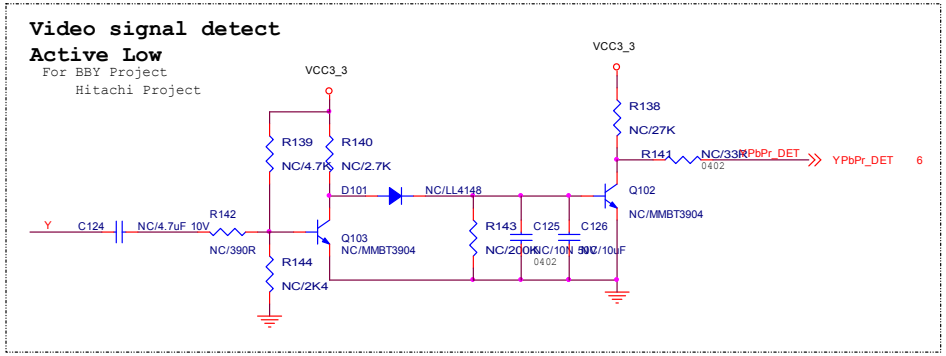


VGA Input
(Back)

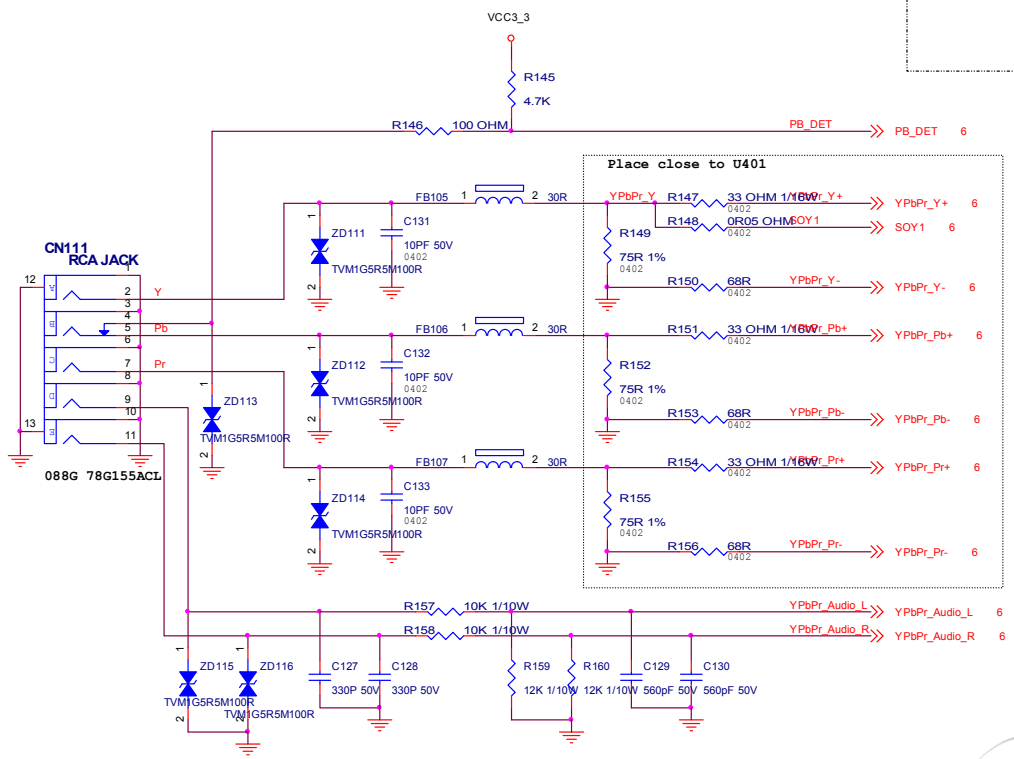


AV Input
(Share with YPbPr_Y)
(Back)

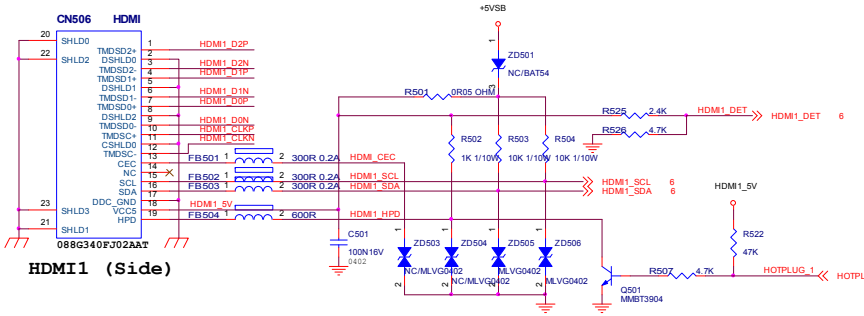


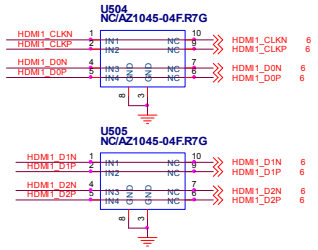


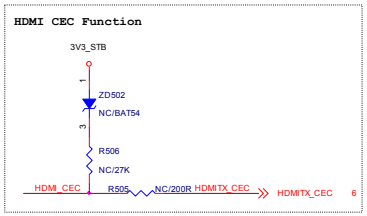
YPbPr
Input
(Back)



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
話隔瓜貓腹		TPV MODEL		Rev	D
Key Component	04-AV/YPbPr Inputs	PCB NAME		称爹	<称爹>
Date	Friday, August 03, 2012	Sheet	4 of 12		





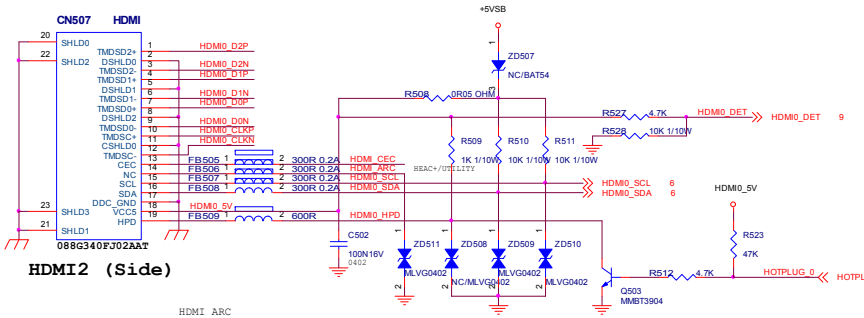


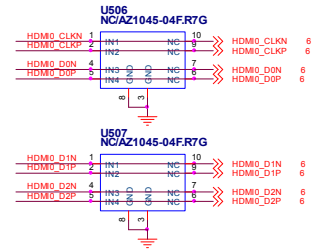
HDMI 0 Trace (mil)

D0P	3857.34
D0N	3924.65
D1P	3753.36
D1N	3807.43
D2P	3686.33
D2N	3638.82
CLKP	3978.07
CLKN	3970.23

HDMI 1 Trace (mil)

D0P	4318.78
D0N	4385.45
D1P	4203.87
D1N	4264.43
D2P	4118.97
D2N	4073.87
CLKP	4446.69
CLKN	4433.17

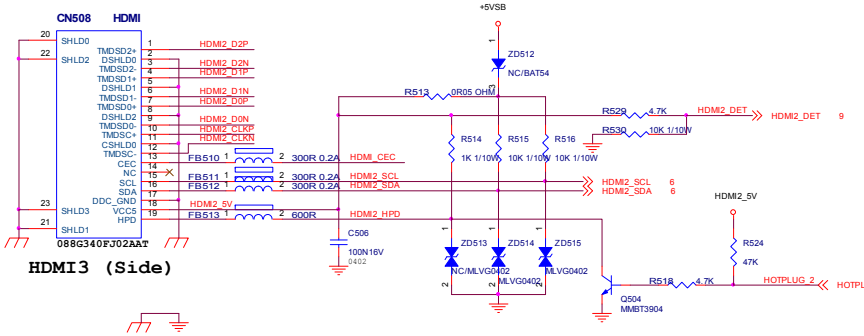


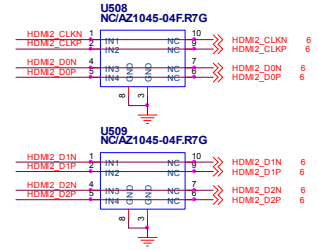


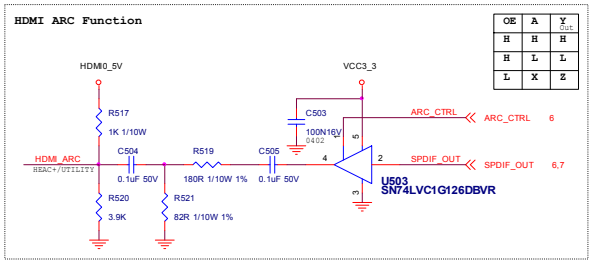
HDMI 2 Trace (mil)

D0P	2229.69
D0N	2269.69
D1P	2241.65
D1N	2312.67
D2P	2329.56
D2N	2293.05
CLKP	2287.90
CLKN	2248.26

HDMI ARC
DC voltage level = 4V
Signal voltage p-p = 500 mV +-100mV (Test need add 55 ohm terminal resistor to GND)
Tr,Tf <= 60 ns

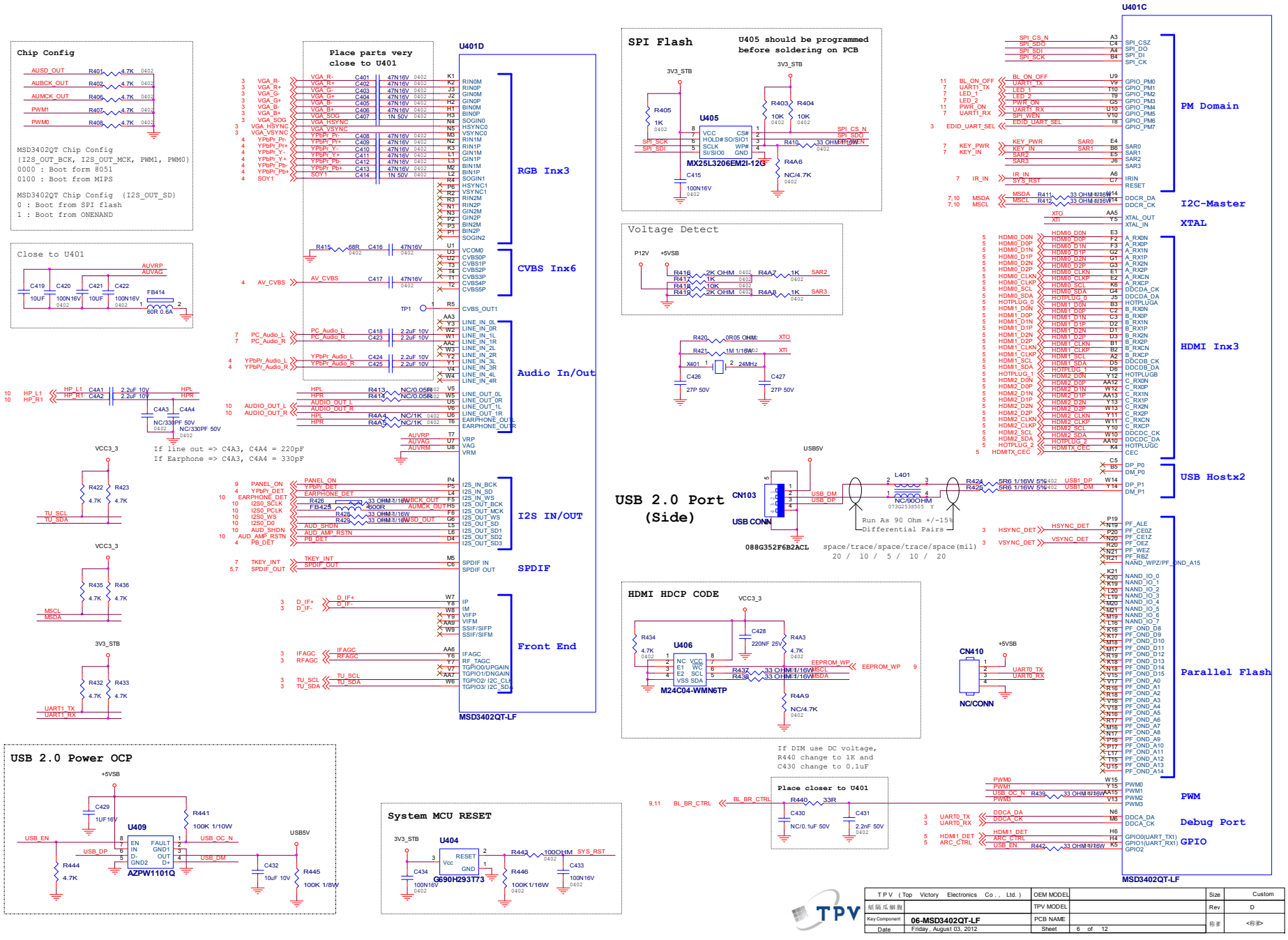


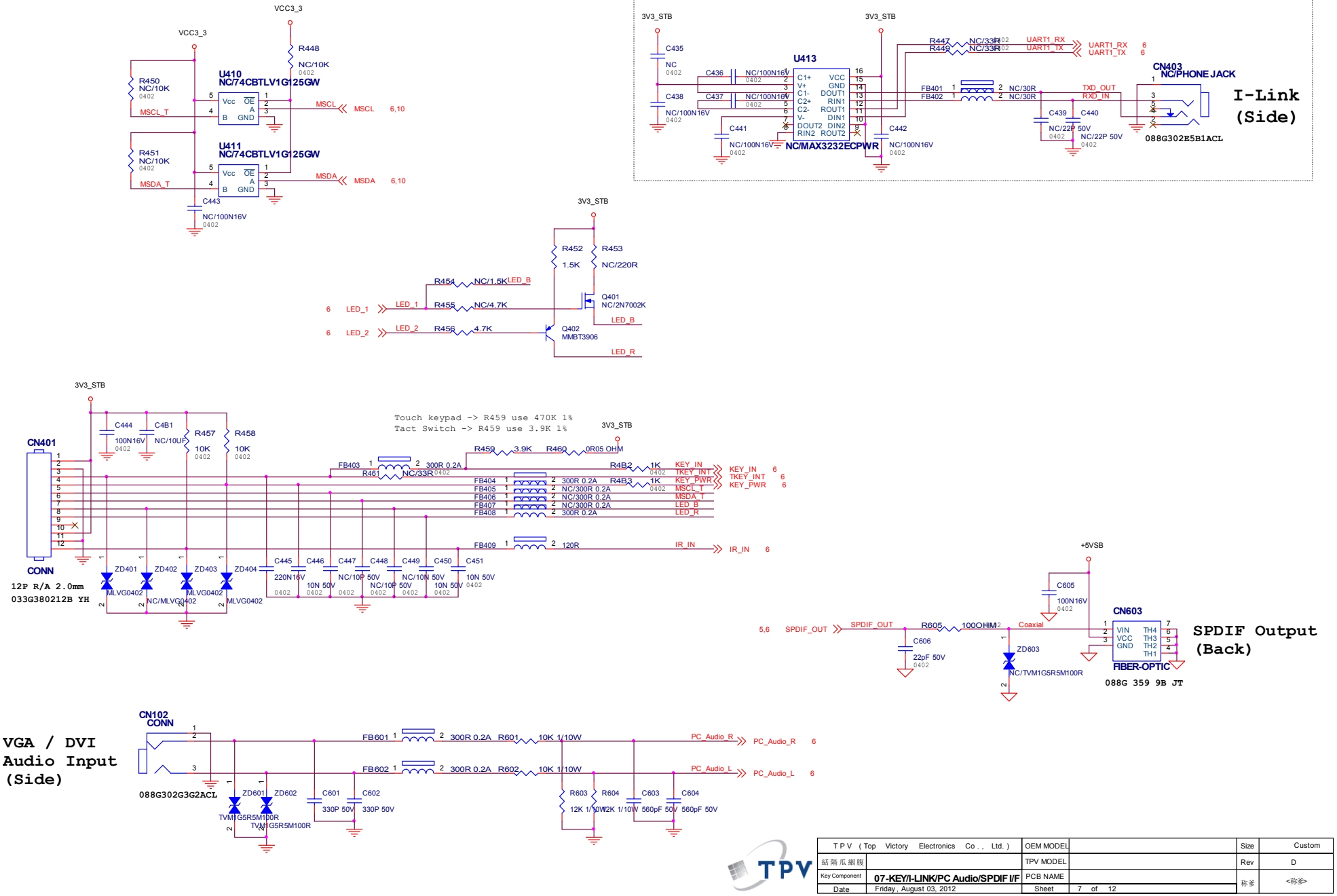




CN506, CN507, CN508 use 088G340FJ02AAT or 088G340FJ02ATE

TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
版陽瓜編腹		TPV MODEL		Rev	D
Key Component	05-HDMI Inputs	PCB NAME		修改	<修改>
Date	Friday, August 03, 2012	Sheet	5 of 12		

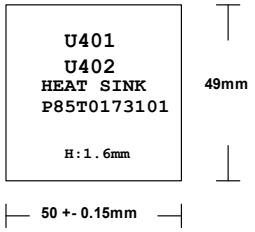

Chip Config
AUSD_OUT
AUBCK_OUT
AUMCK_OUT
PWM1
PWM0
R401 4.7K 0402
R402 4.7K 0402
R406 4.7K 0402
R407 4.7K 0402
R408 4.7K 0402
MSD3402QT Chip Config
{I2S_OUT_BCK, I2S_OUT_MCK, PWM1, PWM0}
0000 : Boot form 8051
0100 : Boot from MIPS
MSD3402QT Chip Config {I2S_OUT_SD}
0 : Boot from SPI flash
1 : Boot from ONENAND
Close to U401
AUVRP
AUVAG
C419 10UF
C420 100N16V 0402
C421 10UF
C422 100N16V 0402
FB414
60R 0.6A
Place parts very close to U401
U401D
RGB Inx3
CVBS Inx6
Audio In/Out
I2S IN/OUT
SPDIF
Front End
MSD3402QT-LF
SPI Flash
U405 should be programmed before soldering on PCB
3V3_STB
R405 1K 0402
R403 10K 0402
R404 10K 0402
U405
MX25L3206EM2I-12G
SPI_SCK
SPI_SDI
SPI_CS_N
SPI_SDO
R410 33 OHM 1/16W 0402
R4A6 NC/4.7K 0402
C415 100N16V 0402
Voltage Detect
P12V
+5VSB
R416 2K OHM 0402
R417 1K 0402
R418 10K 0402
R419 2K OHM 0402
R4A7 1K 0402
R4A8 1K 0402
SAR2
SAR3
R420 0R05 OHM
R421 1M 1/16W
X401 24MHz
C426 27P 50V
C427 27P 50V
XTO
XTI
U401C
PM Domain
I2C-Master
XTAL
HDMI Inx3
USB Hostx2
Parallel Flash
PWM
Debug Port
GPIO
MSD3402QT-LF
USB 2.0 Port (Side)
CN103
USB CONN
088G352F6B2ACL
USB5V
L401
NC/900HM
Run As 90 Ohm +/-15% Differential Pairs
space/trace/space/trace/space(mil)
20 / 10 / 5 / 10 / 20
HDMI HDCP CODE
U406
M24C04-WMN6TP
VCC3_3
C428 220NF 25V
R4A3 4.7K 0402
R4A9 NC/4.7K 0402
EEPROM_WP
CN410
NC/CONN
If DIM use DC voltage,
R440 change to 1K and
C430 change to 0.1uF
Place closer to U401
R440 33R
C430 NC/0.1uF 50V
C431 2.2nF 50V 0402
BL_BR_CTRL
USB 2.0 Power OCP
U409
AZPW1101Q
C429 1UF16V
R441 100K 1/10W
R444 4.7K
C432 10uF 10V
R445 100K 1/8W
USB_EN
USB_OC_N
USB_DP
USB_DM
System MCU RESET
U404
G690H293T73
R443 100OHM
R446 100K1/16W
C433 100N16V
C434 100N16V
SYS_RST
TPV
TPV (Top Victory Electronics Co., Ltd.)
OEM MODEL
TPV MODEL
PCB NAME
06-MSD3402QT-LF
Date
Friday, August 03, 2012
Sheet 6 of 12
Size Custom
Rev D

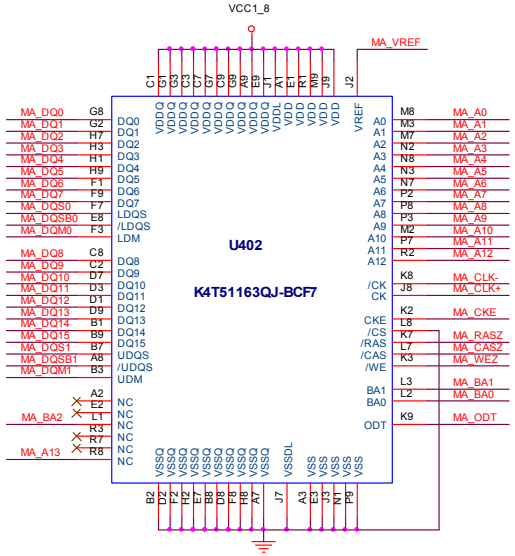

Sound Bar Function for BBY Project
I-Link (Side)
SPDIF Output (Back)
VGA / DVI Audio Input (Side)
U410 NC/74CBTLV1G125GW
U411 NC/74CBTLV1G125GW
U413
NC/MAX3232ECPWR
CN403 NC/PHONE JACK
088G302E5B1ACL
CN401
CONN
12P R/A 2.0mm
033G380212B YH
Touch keypad -> R459 use 470K 1%
Tact Switch -> R459 use 3.9K 1%
CN603
FIBER-OPTIC
088G 359 9B JT
CN102
CONN
088G302G3G2ACL
TPV
Key Component
07-KEY/I-LINK/PC Audio/SPDIF I/F
Friday, August 03, 2012
Sheet 7 of 12

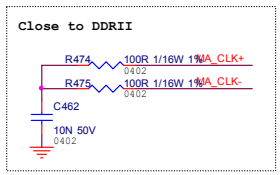
512Mb 800MHz (32Mx16) DDRII
056G 615159 K4T51163QJ-BCF7
056G 615147 H5PS5162GFR-S6C
056G 615131 NT5TU32M16DG-AC

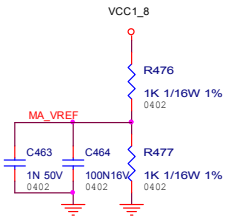
1Gb 800MHz (64Mx16) DDRII
056G 615157 H5PS1G63EFR-S6C
056G 615128 NT5TU64M16GG-AC

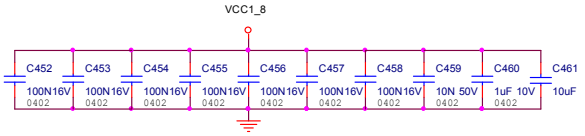
Pin	Trace (mil)		Pin	Trace (mil)	
	MA	MIUA	MA	MIUA	
A0	1003.72	398.31	DQ0	534.9	536.05
A1	1347.25	435.98	DQ1	717.37	422.58
A2	1061.27	432.95	DQ2	624.99	460.8
A3	1530.49	389.25	DQ3	911.3	420.67
A4	896.42	623.45	DQ4	877.43	381.02
A5	1511.74	434.9	DQ5	576.21	490.31
A6	1009.03	586.37	DQ6	631.72	485.84
A7	1684.96	410.43	DQ7	469.13	466.94
A8	985.08	624.79	DQ8	348.96	523.66
A9	1685.6	457.15	DQ9	410.4	509.91
A10	1430.19	472.05	DQ10	450.96	558
A11	1040.77	589.9	DQ11	607.77	446.94
A12	1733.77	442.31	DQ12	500.23	540.98
A13	1317.58	270.92	DQ13	398.62	521.90
BA0	1250.87	443.94	DQ14	327.89	572.7
BA1	1160.4	407.43	DQ15	287.72	565.37
BA2	1229.85	482.42	DQM1	213.45	618.4
CASZ	969.78	455.4	DQM0	287.02	626.33
RASZ	948.08	387.16	DQS1	330.41	490.38
WEZ	1071.73	410.7	DQSB1	291.56	418.67
CKE	1077.88	478.58	DQS0	440.04	494.01
CK+	798.09	387.2	DQSB0	459.41	452.23
CK-	823.98	431.55	ODT	158.49	1121.45

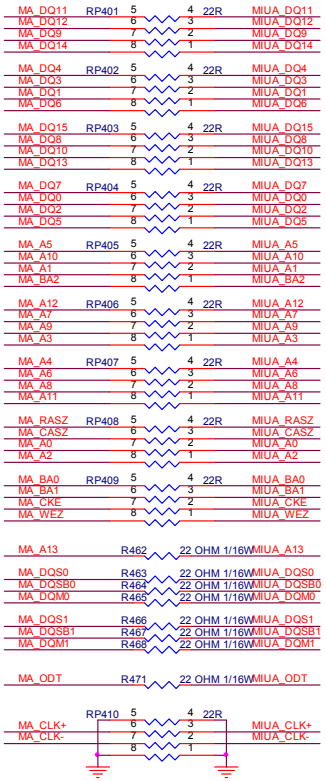


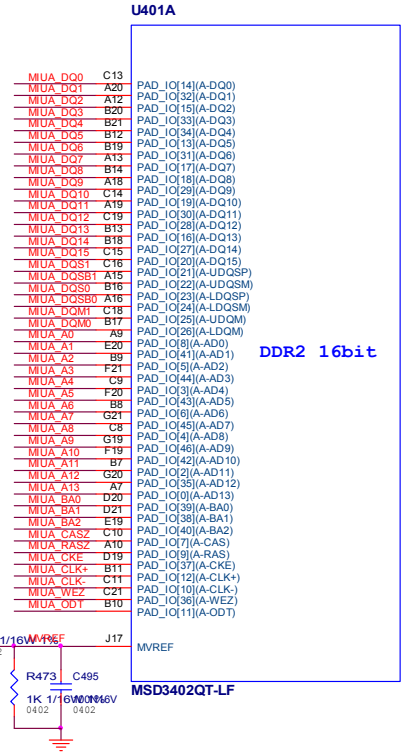












TPV (Top Victory Electronics Co., Ltd.)	OEM MODEL	Size	Custom
結陽瓜網腹	TPV MODEL	Rev	D
Key Component 08-DDRII SDRAM I/F	PCB NAME	称爹	<称爹>
Date Friday, August 03, 2012	Sheet 8 of 12		

space/trace/space/trace/space(mil)
25 / 8 / 6 / 8 / 25

R479 24" -> 1K
32" -> NC

U401B

LVDS
GPIO

R_ODD7/LB0P/RLV6P
R_ODD6/LB0N/RLV6N
R_ODD5/LB1P/RLV7P
R_ODD4/LB1N/RLV7N
R_ODD3/LB2P/RLV8P
R_ODD2/LB2N/RLV8N
R_ODD1/LBCKP/LLV0P
R_ODD0/LBCKN/LLV0N
G_ODD7/LB3P/LLV1P
G_ODD6/LB3N/LLV1N
G_ODD5/LB4P/LLV2P
G_ODD4/LB4N/LLV2N
G_ODD3/LA0P/LLV3P
G_ODD2/LA0N/LLV3N
G_ODD1/LA1P/LLV4P
G_ODD0/LA1N/LLV4N
B_ODD7/LA2P/LLV5P
B_ODD6/LA2N/LLV5N
B_ODD5/LACKP/LLV6P
B_ODD4/LACKN/LLV6N
B_ODD3/LA3P/LLV7P
B_ODD2/LA3N/LLV7N
B_ODD1/LA4P/LLV8P
B_ODD0/LA4N/LLV8N

T20 LVDS_D0O_P
T21 LVDS_D0O_N
U20 LVDS_D1O_P
T19 LVDS_D1O_N
V20 LVDS_D2O_P
U19 LVDS_D2O_N
V19 LVDS_CKO_P
V21 LVDS_CKO_N
W20 LVDS_D3O_P
W21 LVDS_D3O_N
Y20
Y21
Y19 LVDS_D0E_P
AA20 LVDS_D0E_N
W19 LVDS_D1E_P
AA19 LVDS_D1E_N
Y18 LVDS_D2E_P
AA18 LVDS_D2E_N
Y17 LVDS_CKE_P
W18 LVDS_CKE_N
Y16 LVDS_D3E_P
W17 LVDS_D3E_N
W16
AA16

T12 PWR_OK
U12 R481 33 OHM 1/16W EEPROM_WP
T13 HDMI2_DET
U13 HDMI0_DET

LVSYNC(PAD_TCON0)
LHSYNC(PAD_TCON2)
LDE(PAD_TCON4)
LCK(PAD_TCON6)

PWR_OK 11
EEPROM_WP 6
HDMI2_DET 5
HDMI0_DET 5

R10
TESTPIN

MSD3402QT-LF

PANEL_POWER
C469 0.1uF 50V
C470 47uF 16V
R479 NC/1K 1/4W
PANEL_PW

CN408 CONN
16PX2 S/T 2.0mm
311GW200C32ABL

LVDS_SEL
LVDS_CKE_P
LVDS_D0E_P
LVDS_D1E_P
LVDS_D2E_P
LVDS_D3E_P
LVDS_CKO_P
LVDS_D0O_P
LVDS_D1O_P
LVDS_D2O_P
LVDS_CON_DET

LVDS_CKE_N
LVDS_D0E_N
LVDS_D1E_N
LVDS_D2E_N
LVDS_D3E_N
LVDS_CKO_N
LVDS_D0O_N
LVDS_D1O_N
LVDS_D2O_N
PANEL_CTRL

VCC3_3
R480 NC/4.7K
R481 NC/33R 0402 BL_BR_CTRL_LG
BL_BR_CTRL_LG 11
R482 4.7K
R483 NC/4.7K
R485 NC/33R 0402 BL_BR_CTRL
BL_BR_CTRL 6,11
R487 NC/4.7K
R484 NC/4.7K
R486 0R05 OHM

FFC

PANEL_POWER
LVDS_SEL
LVDS_D0E_N
LVDS_D0E_P
LVDS_D1E_N
LVDS_D1E_P
LVDS_D2E_N
LVDS_D2E_P
LVDS_CKE_N
LVDS_CKE_P
LVDS_D3E_N
LVDS_D3E_P
LVDS_CON_DET

CN409 NC/CONN
FFC CONNECTOR 1.0PICTH 30P
033G801930F CH L

5V for <= 24"
12V for >= 32"

P12V Drop Detect
Active Voltage is 7.4V

VCC3_3
R488 NC/10K
R489 NC/100R PWR_OK
PWR_OK 11
R492 NC/22K
Q403 NC/MMBT3904
P12V
R493 NC/1.2K
U412 NC/AZ809ANSTR-E1
RESET
Vcc
GND
D401 NC/RB501V-40
R495 NC/100K
C493 NC/100N16V
R496 NC/820R 1/10W 1%

6 PANEL_ON
PANEL_ON R499 4.7K
R4A1 10K 1/10W

+5V +12V
+5VSB
P12V
R490 NC/0 OHM 1/4W
R491 0 OHM 1/4W
Q404 AO4449 -7A/-30V
PANEL_POWER
C490 220NF 25V
R494 47K
R497 0R05 OHM
R498 150K
R4B4 0R05 OHM
BAS316 D402
Q405 MMBT3904

R498 24" -> 20K
32" -> 150K
5/31 ADD R4B4 & D402

U401E

VCC1_8
R478 0 OHM 1/8W
AVDD_DDR
C465 C466 C467 C468 100N16V 0402
C469 10UF

AVDD_DDR
AVDD_MEMPLL
FB411 60R 0.6A
C471 100N16V 0402
VCC3_3
FB412 60R 0.6A
C472 C473 100N16V 0402
VDDP
3V3_STB
FB413 60R 0.6A
AVDD3P3_DVI
C474 C475 100N16V 0402
VCC1_26
R4A2 0 OHM 1/8W
C476 C477 C478 C479 100N16V 0402 1uF 10V 0402
VDD
FB415 60R 0.6A
C480 C481 100N16V 0402 1uF 10V 0402
DVDD_MU
AVDDTP2_ADC
DVDD_NODIE
FB416 60R 0.6A
C482 C483 1uF 10V 0402
AVSS_PGA
FB419 60R 0.6A

AVDD_DDR
AVDD2P5_PGA
AVDD2P5_ADC
AVDD2P5_AU
AVDD2P5_REF
AVDD2P5_MOD
AVDD3P3_ADC
AVDD3P3_DVI
AVDD_DMPLL
AVDD_AU33
AVDD_EAR33
AVDD1P2_ADC
DVDD_NODIE
AVSS_PGA

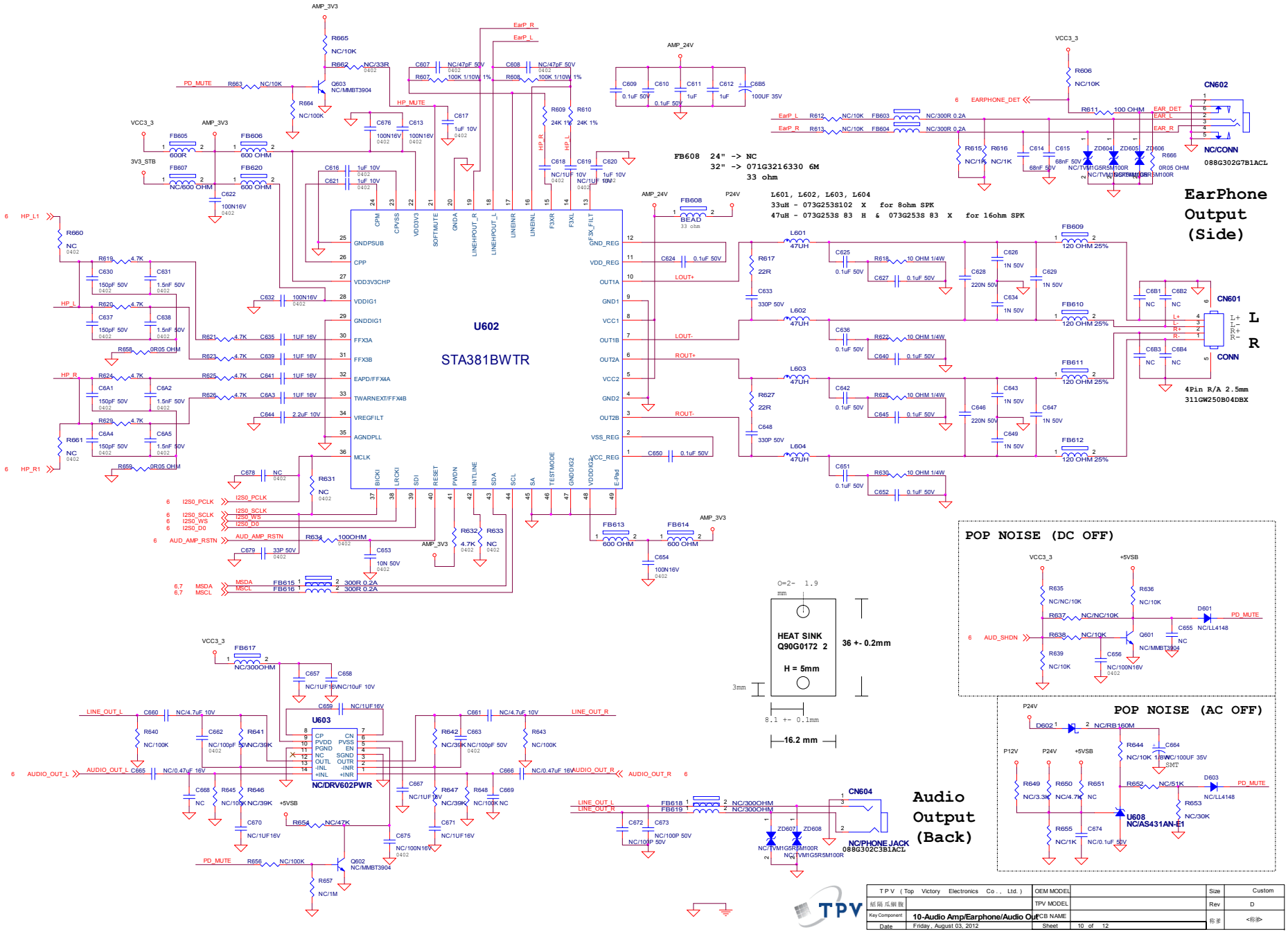
GND_EFUSE
PWR/GND

VCC2_5
FB418 60R 0.6A
AVDD2P5_ADC
AVDD2P5_REF
AVDD2P5_AU
C485 C487 C492 100N16V 0402
AVDD2P5_MOD
AVDD2P5_PGA
FB421 60R 0.6A
C489 C494 100N16V 0402
AVSS_PGA

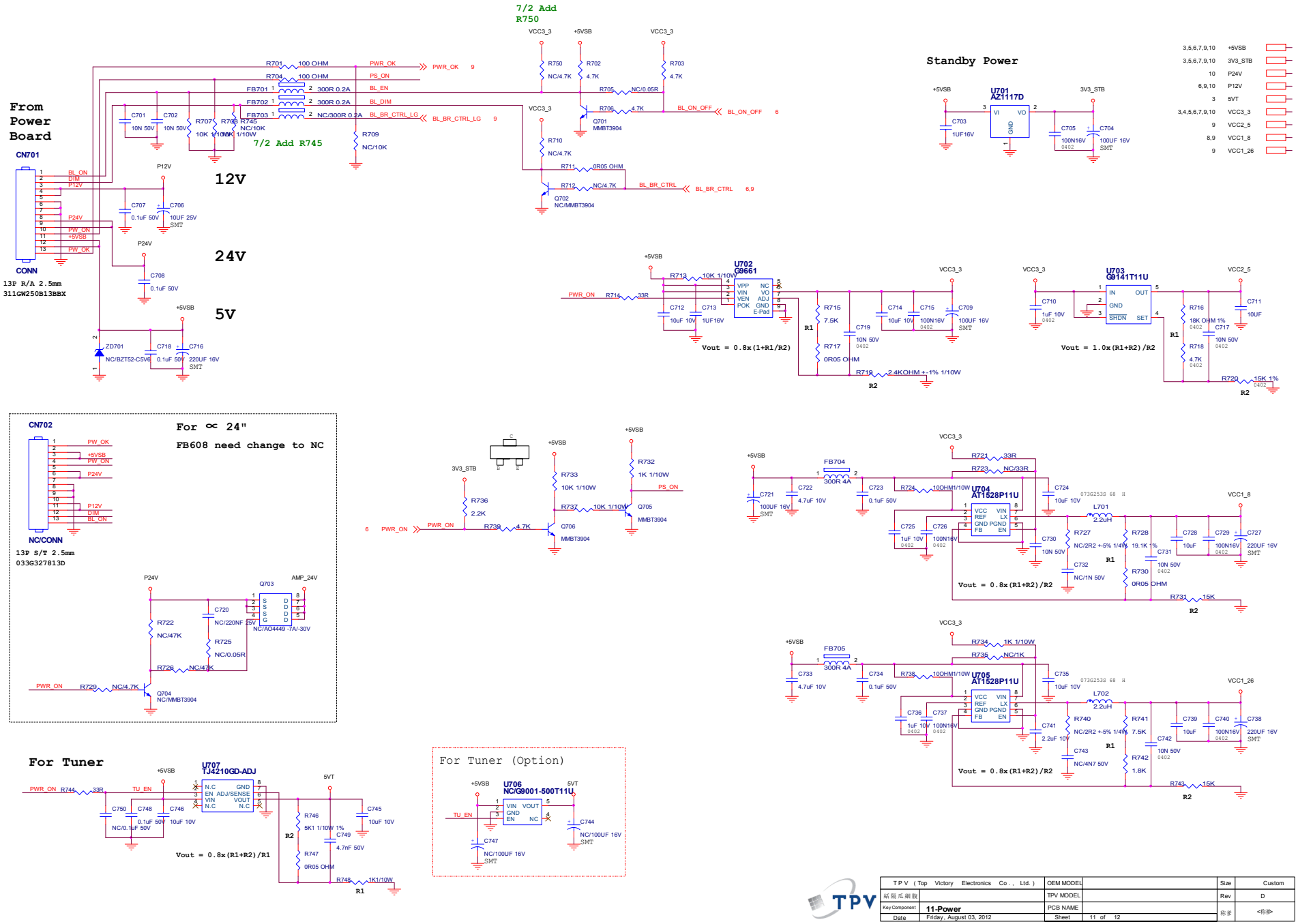
3V3_STB
FB417 60R 0.6A
AVDD_DMPLL
C484 100N16V 0402
FB420 60R 0.6A
AVDD3P3_ADC
C486 100N16V 0402
FB422 60R 0.6A
AVDD_EAR33
C488 100N16V 0402
FB424 60R 0.6A
AVDD_AU33
C491 100N16V 0402

MSD3402QT-LF

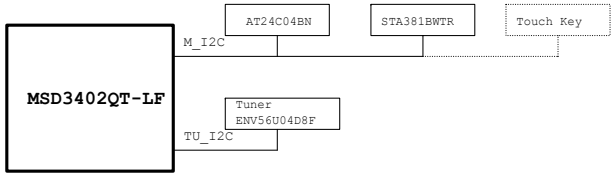
TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
結陽瓜銅腹		TPV MODEL		Rev	D
Key Component	09-LVDS I/F	PCB NAME		称爹	<称爹>
Date	Friday, August 03, 2012	Sheet	9 of 12		



T.P.V (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
紙屬瓜編製		TPV MODEL		Rev	D
Key Component	10-Audio Amp/Earphone/Audio Out	PCB NAME		称重	<称重>
Date	Friday, August 03, 2012	Sheet	10 of 12		



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
結構瓜編號		TPV MODEL		Rev	D
Key Component	11-Power	PCB NAME			
Date	Friday, August 03, 2012	Sheet	11 of 12		



MSD3402QT-LF Absolute DC Voltage

Voltage	Absolute Max. Ratings
VDD_33	3.60 V
VDD_25	2.75V
VDD_18	1.98 V
VDD_126	1.32 V
V_IN5VTOL	5.0 V
V_IN	3.6 V

MSD3402QT-LF ADC Pin Table

MSD3402QT-LF ADC #	Pad NO.	Function
SAR0	E4	Power Key
SAR1	B6	Function Key
SAR2	E5	5V_STB Detect
SAR3	J6	12V Detect

ADC Voltage = 0 V~ 3.3 V

MSD3402QT-LF Recommended DC Voltage

Voltage	Recommended DC Voltage
3.3 V (VDD_33)	3.14 V ~ 3.46 V
2.5 V (VDD_25)	2.38 V ~ 2.62 V
1.8 V (VDD_18)	1.70 V ~ 1.90 V
1.26 V (VDD_126)	1.20 V ~ 1.32 V

MSD3402QT-LF Max. Current Dissipation

Voltage	Max. Current
3.3 V (VDD_33)	162.09 mA
2.5 V (VDD_25)	187.10 mA
1.8 V (VDD_18)	111.30 mA
1.26 V (VDD_126)	901.00 mA

MSD3402QT-LF Sleep mode

Voltage	Max. Current
3.3 V (VDD_33)	7.640 mA
2.5 V (VDD_25)	0 mA
1.8 V (VDD_18)	20.50 mA
1.26 V (VDD_126)	17.20 mA
	83.784 mW

Impedance Control Table	
USB	USB Data differential pair trace impedance 90 Ohm.
HDMI	HDMI Data and Clk differential pair 100 Ohm.
Tuner IF	Tuner IF differential pair trace impedance 100 Ohm.
LVDS	LVDS Data and CLK differential pair trace impedance 100 Ohm.

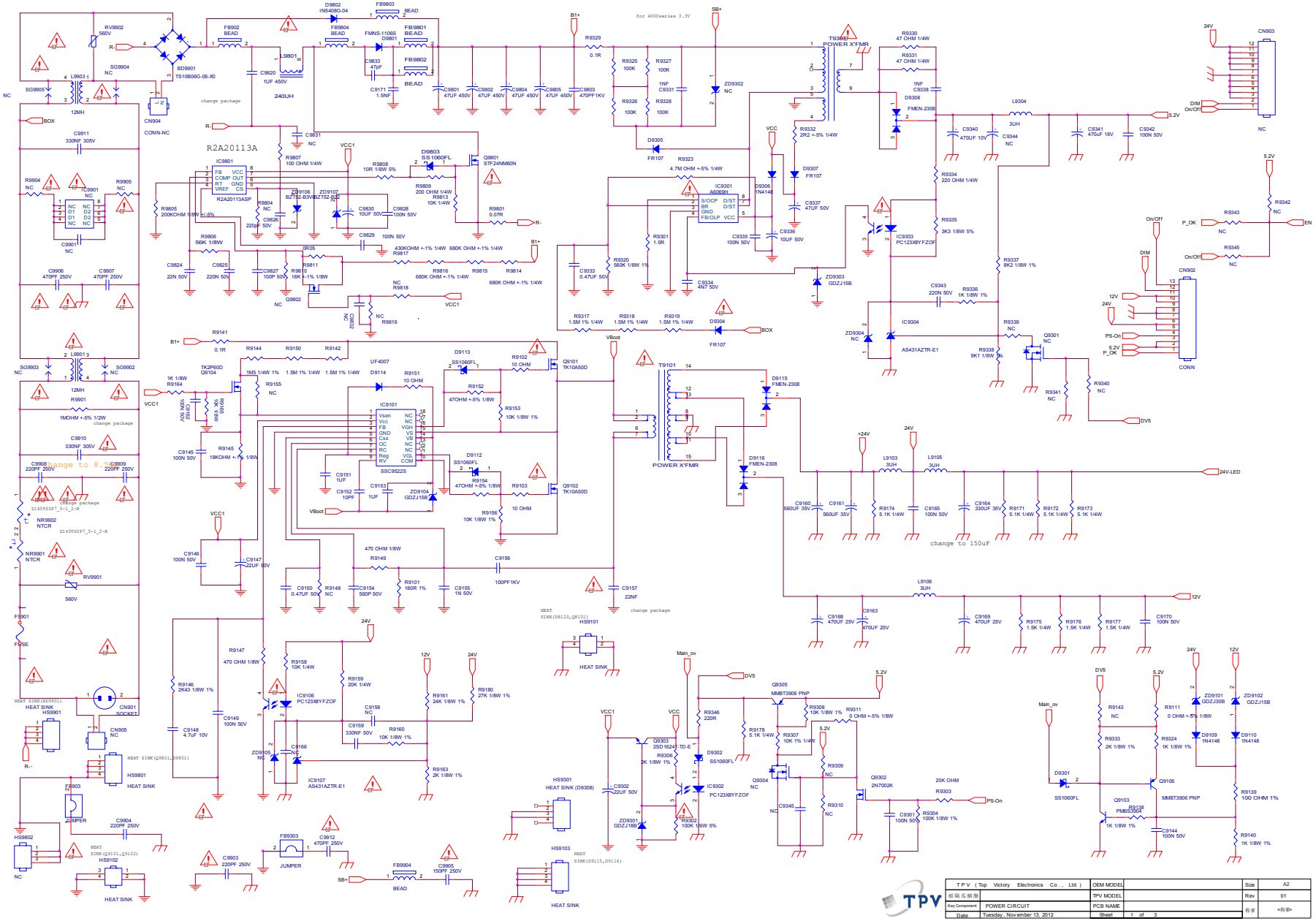
MSD3402QT-LF GPIO Pin Table

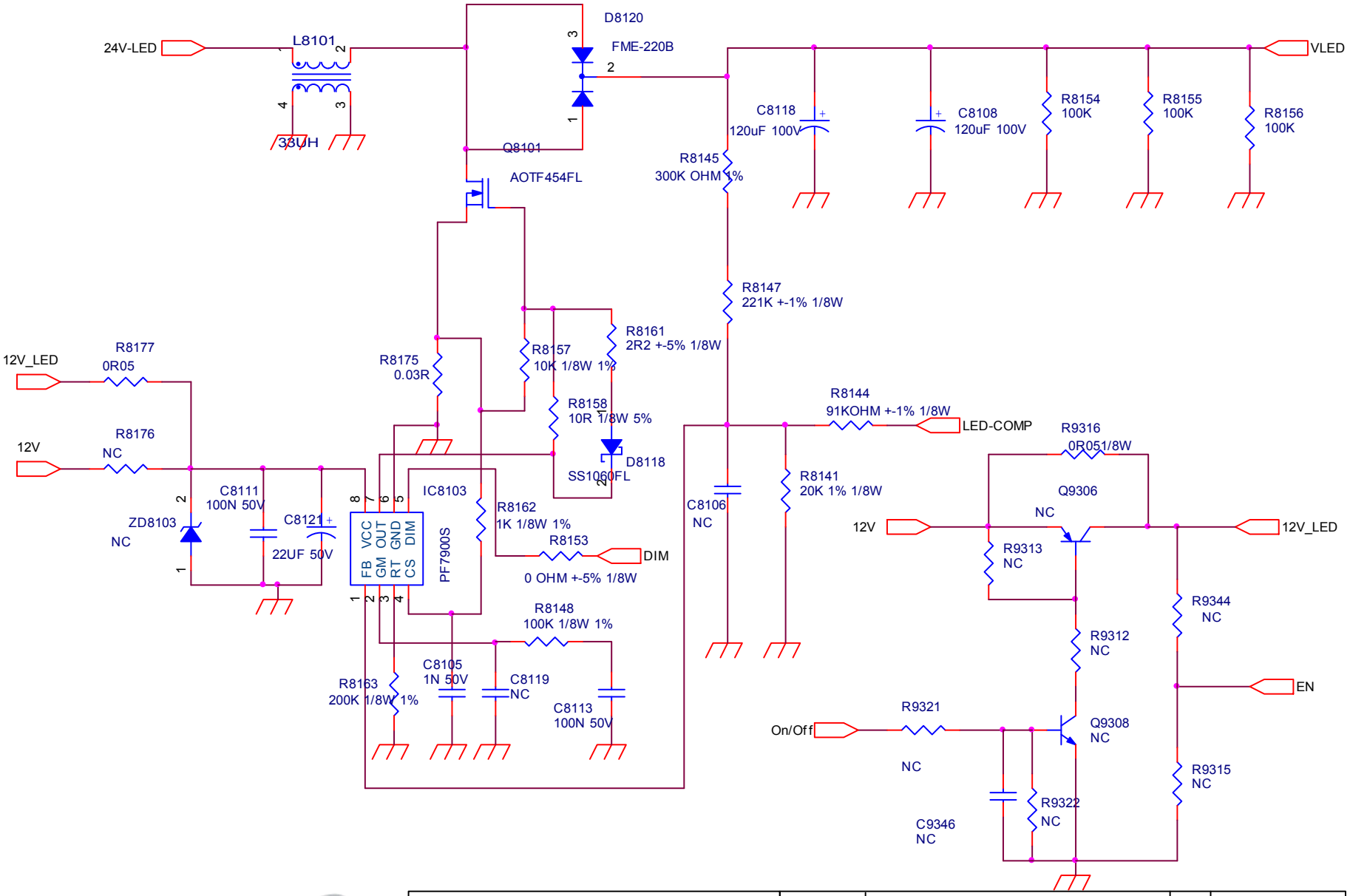
Signal	MSD3402QT-LF GPIO #	Pad NO.	I/O	I/O TYPE	Internal pull-up/down?	Default after RESET	Function
SPI_CS_N	GPIO0 (SPI_CSZ)	A3	I/O	B	X	High	
SPI_SCK	GPIO1 (SPI_CK)	B4	I/O	B	X	Low	
SPI_SDI	GPIO2 (SPI_DI)	A4	I	B	X	Low	
SPI_SDO	GPIO3 (SPI_DO)	C4	O	B	PU 2.5V	I	
IR_IN	GPIO4 (IRIN)	A6	I	B	PU 2.5V	I	IR Input
HDMITX_CEC	GPIO5 (CEC)	K4	I/O	B	Tri-state	I	HDMI CEC Function
BL_ON_OFF	GPIO6 (GPIO_PM0)	U9	O	B	PU 2.5V	I	Backlight ON/OFF
UART1_TX	GPIO7 (GPIO_PM1)	V9	O	B	PU 2.5V	I	UART 1 TX
LED_1	GPIO8 (GPIO_PM2)	T10	O	B	PU 2.5V	I	LED Blue
LED_2	GPIO9 (GPIO_PM3)	T9	O	B	PU 2.5V	I	LED RED
PWR_ON	GPIO10 (GPIO_PM4)	G5	O	B	PU 2.5V	I	Power ON
UART1_RX	GPIO11 (GPIO_PM5)	U10	I	B	PU 2.5V	I	UART 1 RX
SPI_WEN	GPIO12 (GPIO_PM6)	V10	O	B	X	Low	Flash Write Protect
EDID_UART_SEL	GPIO13 (GPIO_PM7)	T8	O	B	PU 2.5V	I	VGA EDID and UART function Select
HOTPLUG_0	GPIO19 (HOTPLUGA)	J5	O	B	PU 2.5V	I	HDMI 0 Hotplug
HOTPLUG_1	GPIO20 (HOTPLUGB)	D6	O	B	Tri-state	I	HDMI 1 Hotplug
HOTPLUG_2	GPIO21 (HOTPLUGC)	AA10	O	B	Tri-state	I	HDMI 2 Hotplug
HDMI0_SCL	GPIO22 (DDCDA_CK)	K6	I/O	B	Tri-state	I	HDMI 0 SCL
HDMI0_SDA	GPIO23 (DDCDA_DA)	G4	I/O	B	Tri-state	I	HDMI 0 SDA
HDMI1_SCL	GPIO24 (DDCDB_CK)	A2	I/O	B	Tri-state	I	HDMI 1 SCL
HDMI1_SDA	GPIO25 (DDCDB_DA)	D5	I/O	B	Tri-state	I	HDMI 1 SDA
HDMI2_SCL	GPIO26 (DDCDC_CK)	Y10	I/O	B	Tri-state	I	HDMI 2 SCL
HDMI2_SDA	GPIO27 (DDCDC_DA)	W10	I/O	B	Tri-state	I	HDMI 2 SDA
HDMI1_DET	GPIO33 (GPIO0)	H6	I	B	PU 2.5V	I	HDMI1 Input Detect
ARC_CTRL	GPIO34 (GPIO1)	H4	O	B	PU 2.5V	I	HDMI ARC Enable
USB_EN	GPIO35 (GPIO2)	K5	O	B	PU 2.5V	I	USB Power Enable
BOOT Config	GPIO45 (PWM0)	W15	I	B	PU 2.5V	I	BOOT Config
BOOT Config	GPIO46 (PWM1)	Y15	I	B	PU 2.5V	I	BOOT Config
USB_OC_N	GPIO47 (PWM2)	AA15	I	B	PU 2.5V	I	USB Power Over Current Flag Output
BL_BR_CTRL	GPIO48 (PWM3)	V13	O	B	PU 2.5V	I	Back Light Brightness Control
MSCL	GPIO49 (DDCR_CK)	M6	I/O	B	PU 2.5V	I	Master SCL
MSDA	GPIO50 (DDCR_DA)	N6	I/O	B	PU 2.5V	I	Master SDA
EARPHONE_DET	GPIO93 (I2S_IN_WS)	L4	I	B	PU 2.5V	I	Earphone Detect
PANEL_ON	GPIO94 (I2S_IN_BCK)	P4	O	B	PU 2.5V	I	PANEL LVDS Power ON/OFF
YPbPr_DET	GPIO95 (I2S_IN_SD)	P5	I	B	PU 2.5V	I	Component Signal Detect
TKEY_INT	GPIO96 (I2S_SPDIF_IN)	M5	O	B	PU 2.5V	I	Touch Key Interrupt
AUD_SHDN	GPIO101 (I2S_OUT_SD1)	L5	O	B	PU 2.5V	I	Audio Lineout Shutdown
AUD_AMP_RSTN	GPIO102 (I2S_OUT_SD2)	L6	O	B	PU 2.5V	I	Audio Amplifier Reset
PB_DET	GPIO103 (I2S_OUT_SD3)	D4	I	B	PU 2.5V	I	Component Pb Detect
SPDIF_OUT	GPIO104 (SPDIF_OUT)	C6	O	B	PD	I	IEC958 SPDIF Output
HDMI0_DET	GPIO159 (LCK)	U13	I	B	X	I	HDMI0 Input Detect
HDMI2_DET	GPIO160 (LDE)	T13	I	B	X	I	HDMI2 Input Detect
EEPROM_WP	GPIO161 (LHSYNC)	U12	O	B	X	I	System EEPROM Write Protect
PWR_OK	GPIO162 (LVSYNC)	T12	I	B	X	I	Inverter Voltage OK
HSYNC_DET	PF_CE0Z	N19	I	B			VGA Hsync Detect
VSYNC_DET	PF_OEZ	N20	I	B			VGA Vsync Detect

TPV (Top Victory Electronics Co., Ltd.)	OEM MODEL		Size: Custom
結陽瓜網股	TPV MODEL		Rev: D
Key Component: 12-GPIO Table	PCB NAME		称多: <称多>
Date: Friday, August 03, 2012	Sheet: 12 of 12		

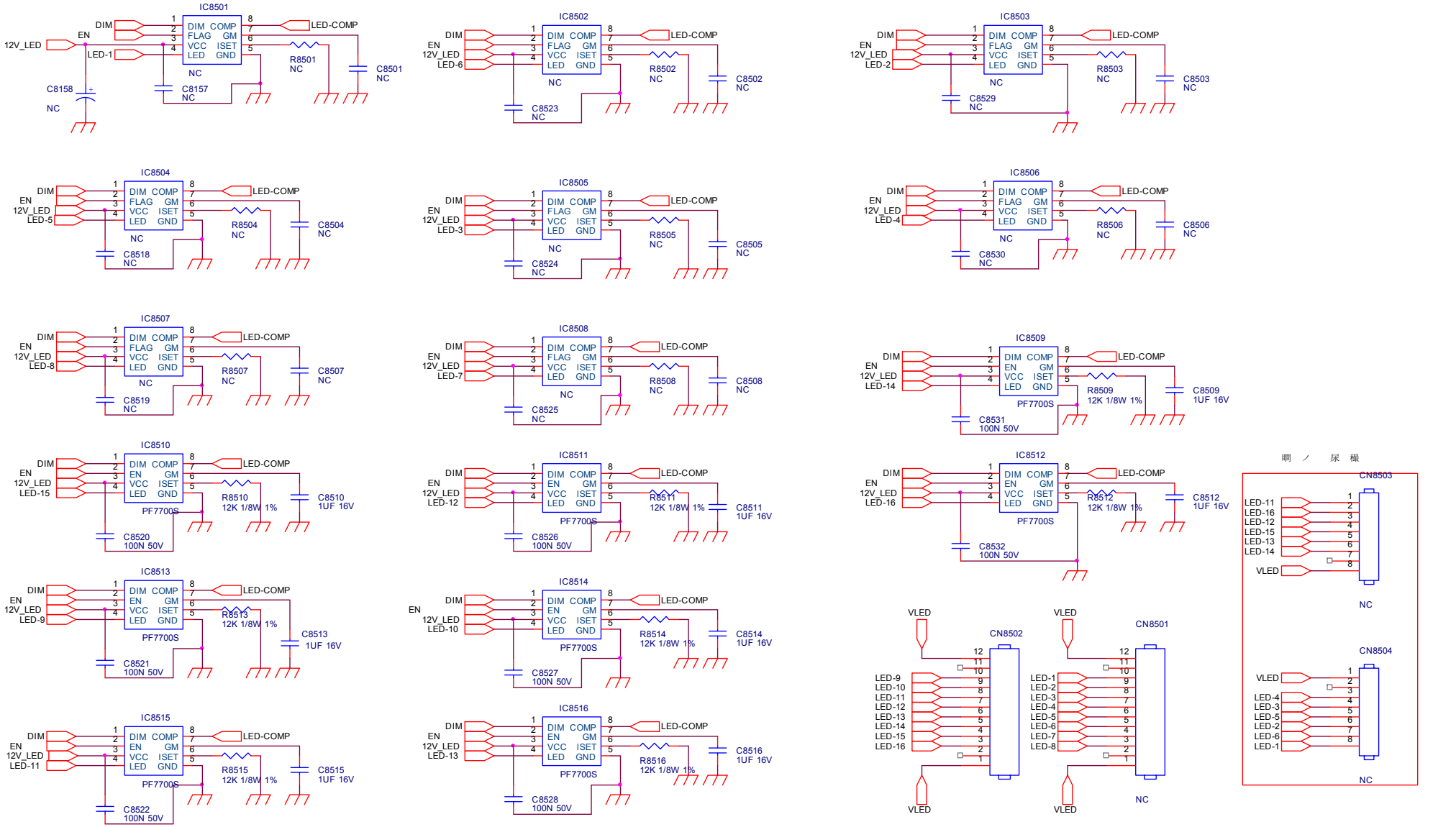
8.2 Power Board

715G5246P01W22002H





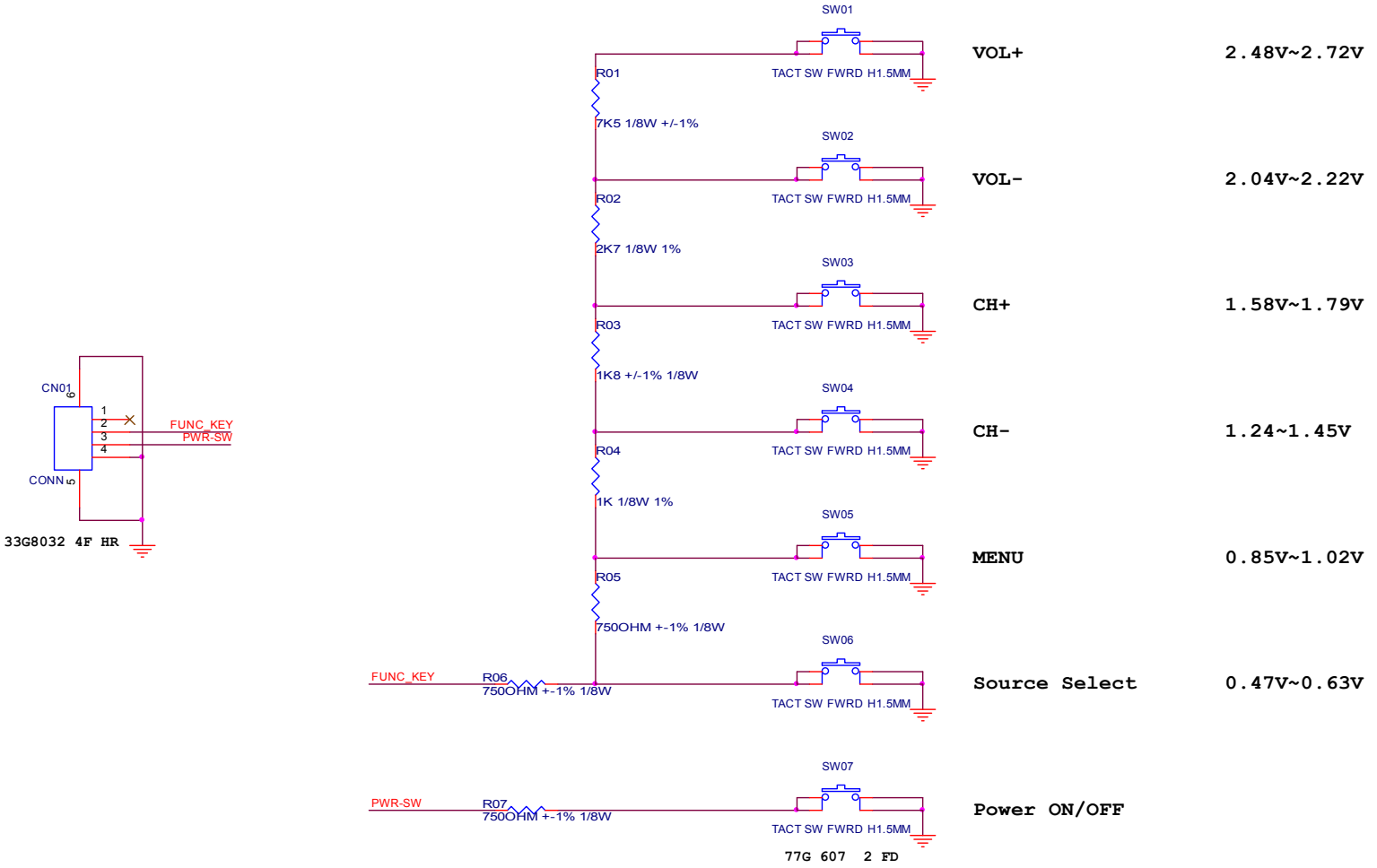
T P V (Top Victory Electronics Co . , Ltd.)		OEM MODEL		Size	A
結 隔 瓜 細 腹		TPV MODEL		Rev	01
Key Component	24V to VLED (DC/DC)	PCB NAME		称爹	<称爹>
Date	Tuesday , Nov ember 13, 2012	Sheet	2 of 3		



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	B
結隔瓜細腹		TPV MODEL		Rev	01
Key Component	LED Driver	PCB NAME		称爹	<称爹>
Date	Tuesday, November 13, 2012	Sheet	3 of 3		

8.3 Key Board

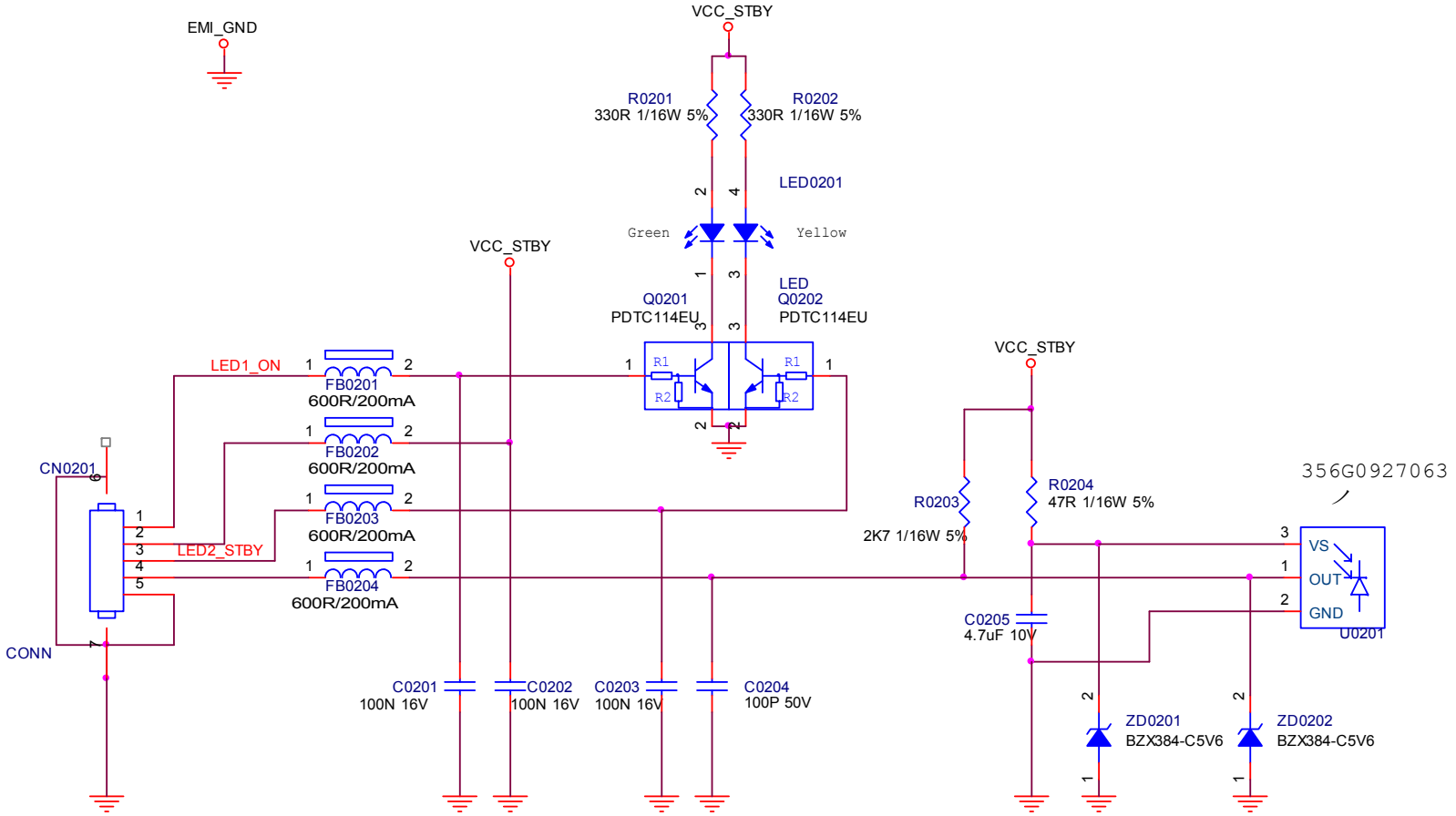
715G5298K01000004S



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	Custom
紙隔瓜網腹		TPV MODEL		Rev	A
Key Component	02-Keypad	PCB NAME		称爹	<称爹>
Date	Tuesday, April 17, 2012	Sheet	2 of 2		

8.4 IR Board

715G4938R01000004S



TPV (Top Victory Electronics Co., Ltd.)		OEM MODEL		Size	A
結隔瓜綑腹		TPV MODEL		Rev	B
Key Component	02. IR BOARD	PCB NAME		称爹	<称爹>
Date	Friday, September 28, 2012	Sheet	2 of 2		

9 Wiring Connection Diagram

9.1. Caution statement.

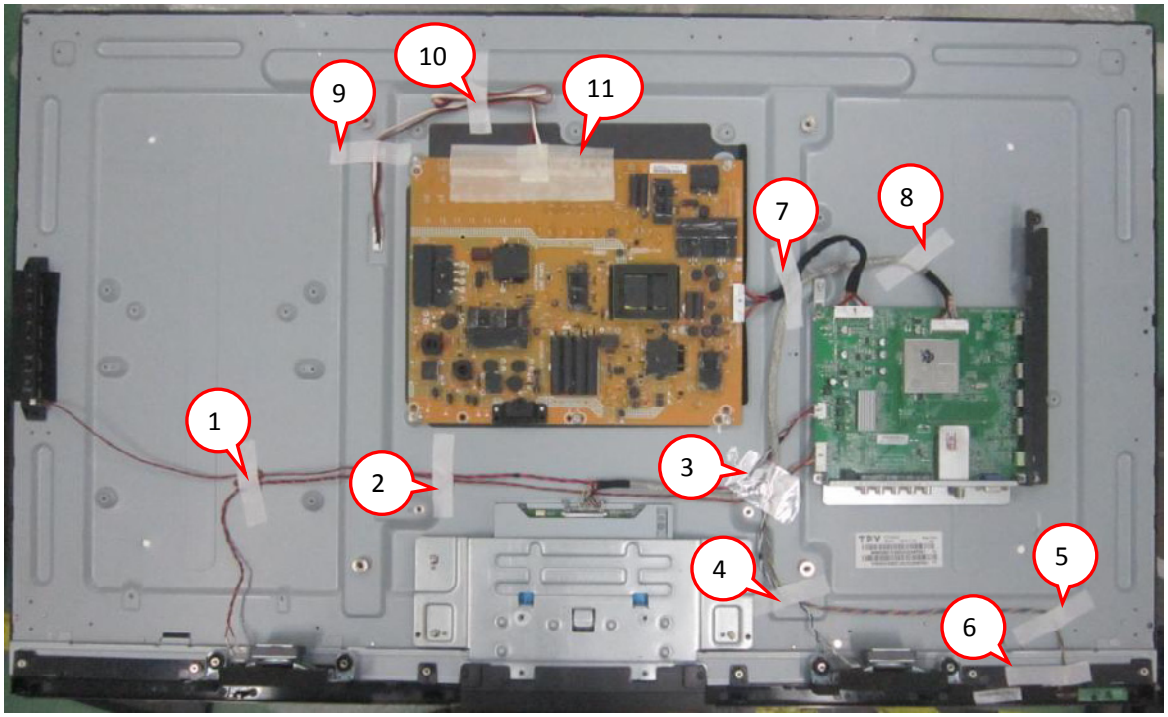
Caution:

Please confirm that all flexible cables are assembled correctly.

Also make sure that they are locked in the connectors.

Verify by giving the flexible cables a very slight pull.

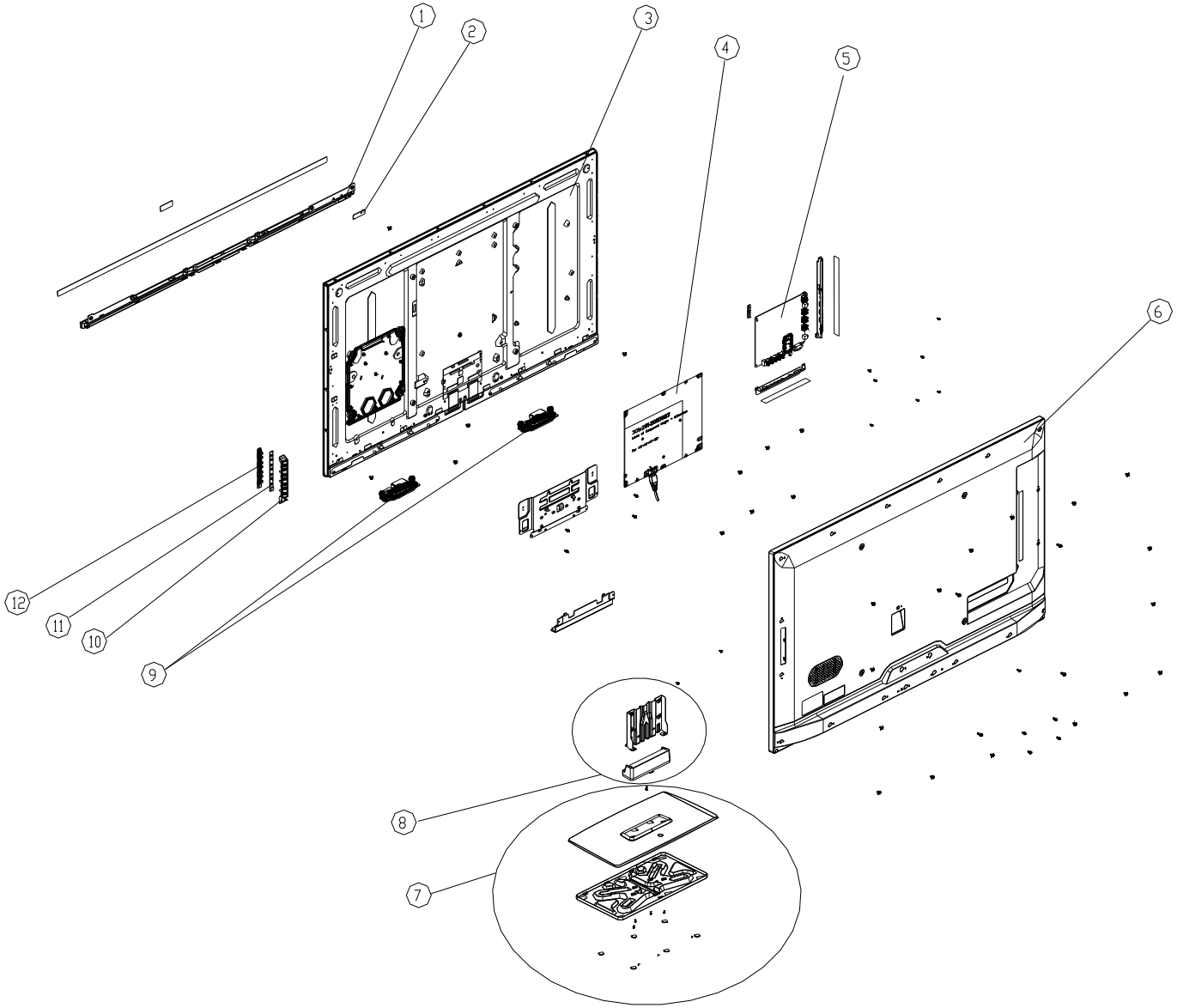
9.2. Wiring



	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CN401-CN01	●	●	●								
CN601-SPEAKERS	●	●	●	●							
CN401-CN0201			●	●	●	●					
CN408-PANEL			●				●	●			
CN902-CN701							●				
CN8502-PANEL									●	●	●

10 Exploded View and Replacement Parts List

10.1. Exploded View



10.2. Replacement Parts List

Model Name	Safety Part	Ref. No. (Location)	Panasonic P/N	Part Name & Description	Pcs (Usage)	Remarks	TPV P/N
FVM4612	S	1		Deco Bezel	1		P34T1099ADT01L02BB
FVM4612	S	2		IR Board	1		IRPFBXCB
FVM4612		3		LCD Panel	1		TPT460HM01XA500LX0
FVM4612	S	4		Power Board	1		PLTVCR808XXA3
FVM4612	S	5		Main Board- CBPFC3NKA7	1		756TXCCB01K0730001
FVM4612	S	6		Rear Cover	1		P34T10850GM03X03BA
FVM4612	S	7		Base	1		P34T1091ADT01L0100
FVM4612	S	8		Stand	1		P34T1092ADT01L0100
FVM4612		9		Speaker	2		378G0110567YAN
FVM4612		10		Cover Function	1		P33T0359ADTW1L01BA
FVM4612		11		Key Board	1		KEPFCXAF
FVM4612	S	12		Key	1		P33T0361ADTZ1L0100
FVM4612	S			AC Power Cord	1		389G202A15NJRB
FVM4612	S			Remote Controller	1		398GRABD1NESYJ
FVM4612	S			Manual	1		X41G46MV85503B
FVM4612				Rating Label	1		X40G046085506A
FVM4612				Cushion-TL	1		X44GPA301010SY
FVM4612				Cushion-TR	1		X44GPA302010SY
FVM4612				Cushion-BL	1		X44GPA303010SY
FVM4612				Cushion-BR	1		X44GPA304010SY
FVM4612				Cushion-TM	1		X44GPA305010SY
FVM4612	S			Artwork Carton	1		X44GPA3085501A
FVM4612				PE Bag For Base	1		Q45T 76 28NV2 R
FVM4612				Cable	1	CN401-CN01	395G801412RM58
FVM4612				Cable	1	CN601-SPEAKERS	395G801304XM58
FVM4612				Cable	1	CN401-CN0201	395G801412RM58

FVM4612				LVDS Cable	1	CN408-PANEL	395G801851LY95
FVM4612				Cable	1	CN902-CN701	095G801313X909
FVM4612				SCREW	4		0M1G1740 12 47 CR3（M4*12）